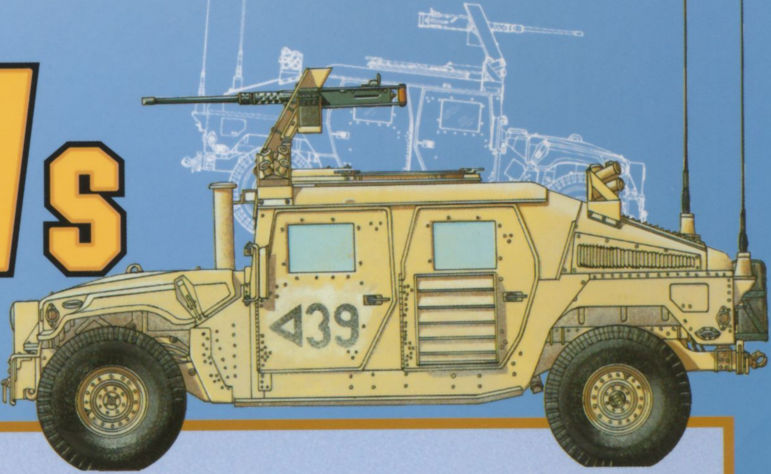
MINI COLOR SERIES 7513

U.S. Army HMMWVs in Iraq

Carl Schulze & Ralph Zwilling



MILITARY POLICE

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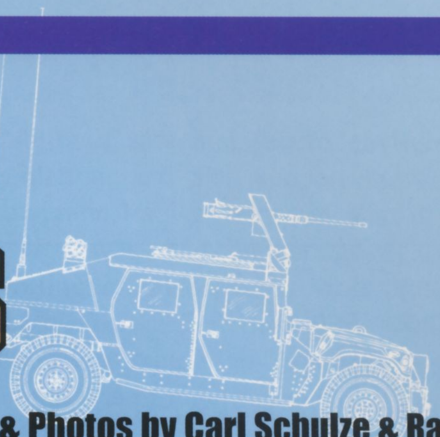
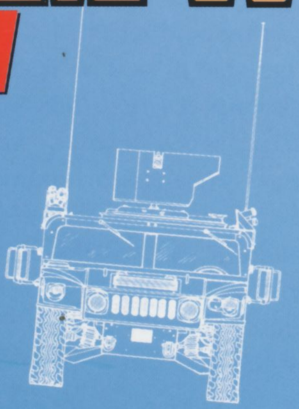
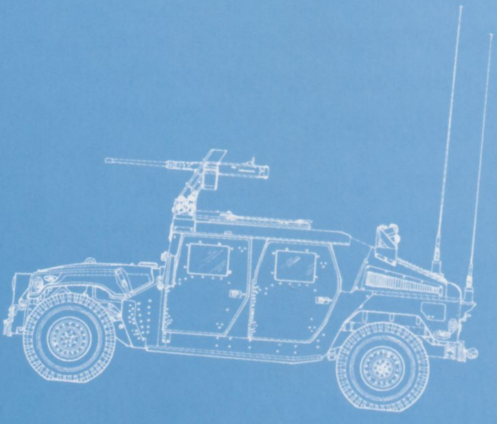
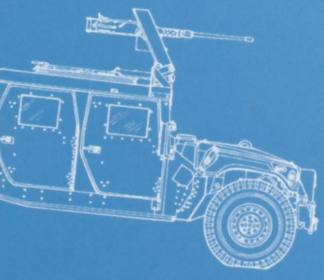
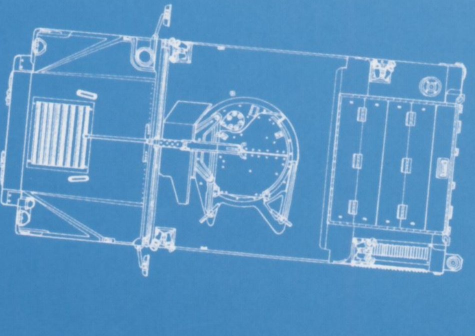
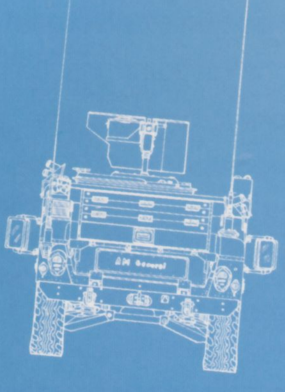
U.S. Army HMMWVs in Iraq

Text & Photos by Carl Schulze & Ralph Zwilling
Illustrations by Hubert Cance

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Introduction

After its introduction into U.S. Army service in 1985, the High Mobility Multipurpose Wheeled Vehicle (HMMWV for short) became the prime utility vehicle of U.S. ground forces. The HMMWV replaced the M151 Ford MUTT, the M274 Mule, the M561 Gama Goat, and to some extent the M880 pickup trucks. Since series production of the HMMWV started in 1985, the vehicle has been produced in a basic M998 model along with various other variants, as well as in the upgraded M998A1 and M998A2 models and their associated variants. Also manufactured by AM General were Expanded Capacity Vehicles and Up-armored models. By June 2004, more than 175,000 HMMWVs had been produced by AM General Corporation in Mishawaka, Indiana, USA. (This total includes HMMWVs of the basic series as well as of the newer A1 and A2 series). While the bulk of these fore mentioned HMMWVs are in service with the U.S. Armed Forces, some 30,000 are also used by more than 40 different nations worldwide. In November 2000, the U.S. Army signed a contract for the production of 31,474 additional HMMWVs, of which 18,000 had been delivered by June 2004. The last of the vehicles covered by this contract will be delivered by 2007.

This book should be seen as a sequel to the Concord Mini Color Series title 7510, "HMMWV – Workhorse of the U.S. Army". It is aimed at giving the HMMWV enthusiast an overview of the HMMWVs used by the U.S. Army in Iraq during Operation "Iraqi Freedom".

Operation "Iraqi Freedom"

Following the events of 11th September 2001, the USA declared war on international terrorism. As part of the U.S. led global war on terror in 2002, the U.S. government decided to launch an attack against Iraq and its dictator Saddam Hussein. The aim of the attack was to topple the dictator's government, find and destroy his weapons of mass destruction (WMD) and establish a democratic government in Iraq. In order to fight this war, the USA drew together some 230,000 U.S. troops from all its armed services in the Persian Gulf region. What followed is well-known history. During the night of 19th March 2003, U.S. Army and USMC divisions crossed the Kuwaiti border and pushed into Iraqi. In the following weeks the U.S. troops, together with their British and Australian allies, destroyed Saddam Hussein's armed forces and occupied most of Iraq. After the official fighting ceased on 1st May 2003, most of the U.S. troops were required to stay in Iraq with a changed mission. While the original mission had been to fight a full-scale war against the Iraqi Army, now their new mission was to establish a safe and secure environment for the Iraqi population, and also support the formation of a new democratic Iraqi government. Part of this newly adapted mission was the conducting of security patrols and escorting of oil convoys. Most of the units which had already seen action during the initial war now found themselves facing an expanding guerrilla war. Their enemies were former regime loyalists as well as groups of terrorists which entered Iraq through the porous borders of the country.

Up till March 2004, it was the troops of the 1st (U.S.) Armored Division "Old Ironsides", the 82nd (U.S.) Airborne Division "All American", the 101st (U.S.) Airborne Division (Air Assault) "Screaming Eagles", and the 4th (U.S.) Infantry Division "Ivy Division" who were fighting in Iraq as part of Operation "Iraqi Freedom". In March 2004, the first major rotation of forces was carried out under the heading of Operation "Iraqi Freedom 2" (OIF2 for short). The following U.S. divisions deployed to Iraq for OIF2: the 1st (U.S.) Infantry Division "Big Red One", 1st (U.S.) Cavalry Division "First Team", as well as the 1st Marine Expeditionary Force. All these divisions were reinforced by additional brigades from other divisions as well as National Guard units.

During their deployment to Iraq all these troops faced and still face a low intensity conflict. Attacks on U.S. convoys by insurgents are a daily occurrence. Mortar and rocket attacks are also conducted by the Iraqis on a regular basis. In addition, IEDs (Improvised Explosive Devices) are placed along U.S. convoy roads in order to slow down the re-supply of U.S. troops in Iraq. Basically it could be said that there is no 100% safe place for U.S. troops in Iraq. The situation became even worse when, in March 2004, militias loyal to the Shi'ite leader Muktada al Sadr began to take up arms against U.S. troops. In the subsequent months through to August, fighting continued in Baghdad and several cities in southern Iraq. Major fighting also took place in the holy city of Najaf. Since the first units gathered in the Gulf region in late 2002, right through until the fighting in Najaf in August 2004, there was virtually not a single U.S. Army unit which did not use an HMMWV in some form or other. The units of these foregoing divisions used HMMWVs for troop transport, as weapon carriers, platforms for surveillance and radio equipment, as command and control vehicles, as ambulances, liaison vehicles and as patrol vehicles with armor protection.

HMMWVs in Iraq

Currently it is estimated that the 136,000 U.S. troops in Iraq operate some 12,000 HMMWVs. These 12,000 HMMWVs include vehicles from the basic, A1 and A2 series. Also deployed in Iraq are HMMWV Expanded Capacity Vehicle models and Up-armored models. Virtually every U.S. army unit can field some HMMWVs. U.S. combat units such as the tank battalions equipped with M1 Abrams main battle tanks, and the mechanized infantry battalions equipped with M2 Bradley infantry fighting vehicles, additionally received heavy armor HMMWVs. This was done to give them greater mobility and allow them to patrol in a less threatening manner in Iraqi cities. For example, a tank platoon, in addition to its four main battle tanks, received four M1114 Up-armored HMMWVs. During operations the HMMWV proved again that it is a reliable, heavy-duty cross-country vehicle which can go virtually anywhere.

However, as Operation "Iraq Freedom" became more and more a guerrilla type war, HMMWVs came under regular enemy fire. Often these attacks on soft skinned or only lightly armored vehicles culminated in the deaths of the vehicle crews. Designed and introduced to the U.S. Army for use in a conventional war with established front lines, most HMMWV models were not required by the U.S. military to have any armor protection. The only exceptions to this were armament carriers and protected ambulance models which were designed to provide some degree of protection against artillery fragments and small arms bullets. HMMWV versions like the M1025 armament carrier with basic armor, featured a "basic" armor package made of a combination of steel, Kevlar and layered polycarbonate windows designed to stop a fragment weighing 17 grains (the equivalent of about 1.1 grams).Vehicles like the USMC HMMWV M1046 TOW missile carrier with supplemental armor had an additional steel layer added to the armor in order to stop a fragment weighing 44 grains (around 2.9 grams).

The problem was that both armored versions of the HMMWV were not able to stop any caliber of bullet at normal operating ranges. Due to this fact, U.S. troops in Iraq started to make their own efforts to protect their vehicles against Iraqi small arms fire, IED attacks and mortar splinters. A common practice was the placing of sand bags on the floor panels of a vehicle in order to counter the explosive impact of IEDs. Another common practice was the mounting of steel plates on vehicle doors, the building of armored boxes (known as a fortress) in the vehicle's cargo bay, as well as the fitting of machine gun mounts. Also a common practice was the mounting of gun shields to the HMMWV's weapon station in order to protect the gunner from enemy fire. While most units up-armored their HMMWVs, others were seen stripping their vehicles of every possible part. Mostly this practice was done by infantry units which needed to quickly get in and out of their vehicles during patrols. In addition, the removing of doors and canvas roofs allowed the troops greater visibility of the surrounding area, as well as a greater arc of fire, when enemy fire had to be returned in an ambush.

Vehicles with Armor Survivability Kits and Up-armored HMMWVs

In addition to the modifications designed and carried out by unit maintenance sections, the U.S. Army in Iraq also fields the newly designed Armor Survivability Kit (ASK). The ASK is mounted to standard HMMWV versions in order to protect their crews against the deadly effect of IEDs and small arms fire. By June, some 8,000 HMMWVs had been fitted with ASK, a kit which features armored doors, armored seatbacks, reinforced floor panels, windshields made of bulletproof glass, heavy-duty latches and rocker protection panels. But even when an HMMWV is fitted with ASK the vehicle is still vulnerable to fire from rooftops, as there is no armor protection on the vehicle's roof.

The highest degree of protection for crew members comes in the form of the Up-armored HMMWVs, designated M1114. The U.S. Army makes wide use of M1114 HMMWVs in Iraq and most units received additional numbers of the armor protected vehicle for patrol duties. Initially the U.S. Army and CENTCOM estimated that 1,000 Up-armored HMMWV M1114s would be sufficient for patrol, convoy protection and transportation in Iraq and Afghanistan. But the increased activities of opposition forces and their change to ambush tactics, as well as the increased use of IEDs, required a much larger number of armor protected M1114s. An updated order gave a requirement of an additional 2500 M1114 HMMWVs. At the time of writing the production of additional Up-armored HMMWV M1114s was under contract. It is said that delivery of these vehicles will be accomplished by March 2006.

Acknowledgments

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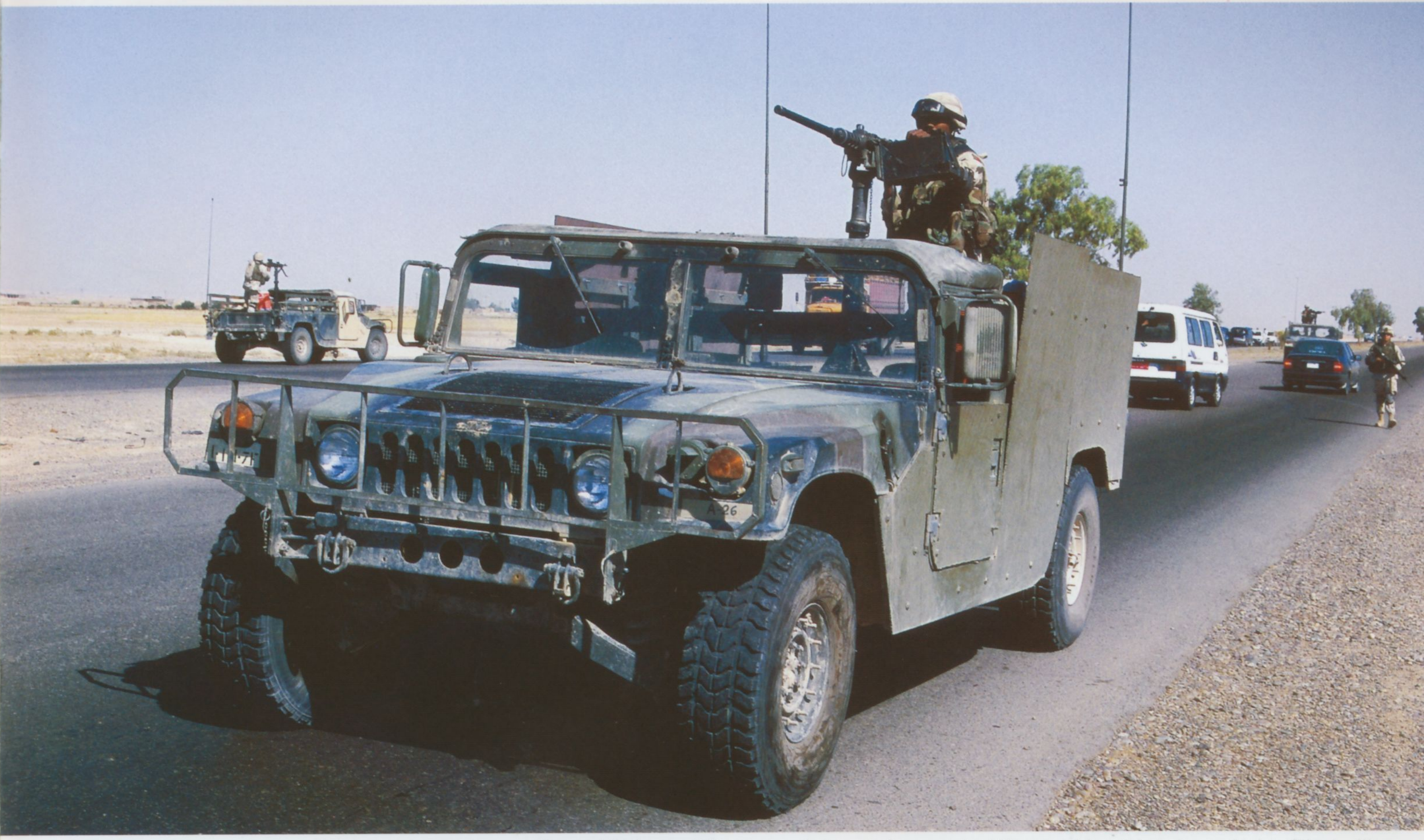
The use of HMMWVs in U.S. units

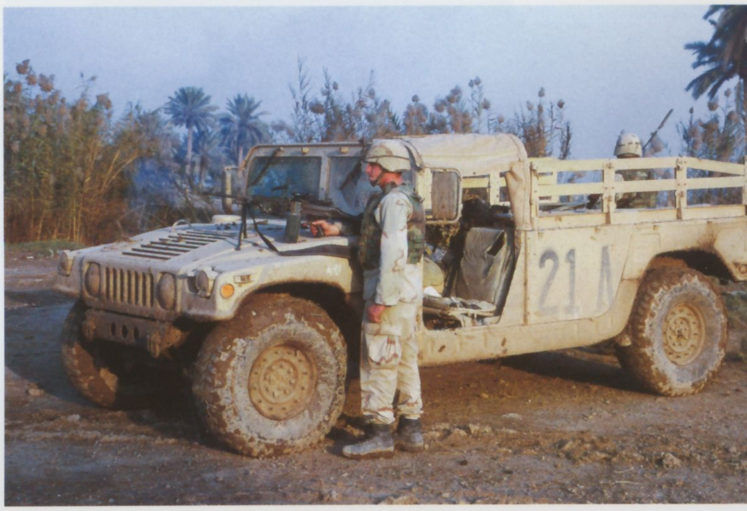


The minimum number of vehicles which are allowed to leave U.S. camps in Iraq is four, and of these, at least two have to be fitted with a crew-served weapon. Here, an M998 HMMWV cargo and troop carrier with two doors and a soft-top, can be seen on a patrol with Task Force 1-7 north of Bayji. The vehicle is armed with a 12.7mm M2A2 HB machine gun. The weapon is mounted in the vehicle's large cargo bay.

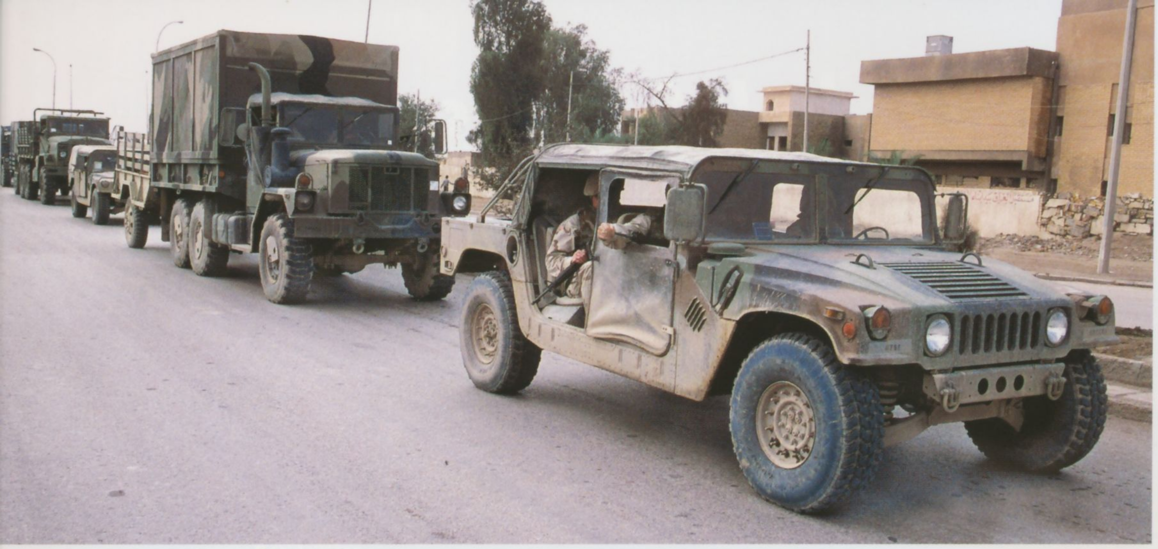
As has already been said in the introduction, the HMMWV is today the prime light 4x4 cross-country vehicle used in U.S. Army units. It is almost impossible to find a U.S. Army unit which does not field some HMMWV version or other. In some units only a few HMMWVs are used for command, control and liaison duties, while in other cases the bulk of the vehicles used within a unit are HMMWVs. For example, a Field Artillery Battalion has 22 HMMWVs in its Headquarters, Headquarter and Service Battery (HHS). Each Firing Battery can field another 7 HMMWVs, and there are three batteries in the battalion. The Target Acquisition Battery is equipped with another 17 HMMWVs. In total the Field Artillery Battalion therefore is equipped with 60 HMMWVs, most of them being M998 HMMWV cargo and troop carriers or M1038 HMMWV cargo and troop carriers with front-mounted winches.

An Armor Battalion is equipped with 35 HMMWVs in its Headquarters and Headquarter Company (HHC), of which 10 belong to the battalion's Scout Platoon. In addition, each of the three tank companies has 2 HMMWVs as command and liaison vehicles. While most HMMWVs in the armor battalion are M998 HMMWV cargo and troop carriers or M1038 HMMWV cargo and troop carriers with winches, the vehicles of the Scout Platoon are M1025 HMMWV armament carriers with basic armor, or M1026 HMMWV armament carriers fitted with basic armor and a winch. A corps level Military Police Battalion can field 10 HMMWVs in its Headquarters and Headquarter Detachment (HHD), and another 35 HMMWVs in each of its three Military Police Companies. This brings the number of HMMWVs in an MP Battalion to 115. In the past most of these have been M1025 HMMWV armament carriers with basic armor, or M1026 HMMWV armament carriers with basic armor and winches, but in Iraq these were entirely replaced with M1114 Up-armored HMMWVs.

An engineer battalion at corps level has 34 HMMWVs in its inventory, and except for one they are all M998 HMMWV cargo and troop carriers or M1038 HMMWV cargo and troop carriers with winches. The one exception is an M997 HMMWV Maxi-Ambulance. In the engineer battalion the HMMWV is mainly used as command and communication vehicles. At the division level Chemical Company, ten HMMWVs are available. All of these are M998 HMMWV cargo and troop carriers or M1038 HMMWV cargo and troop carriers with winches, and are used for command and control purposes.



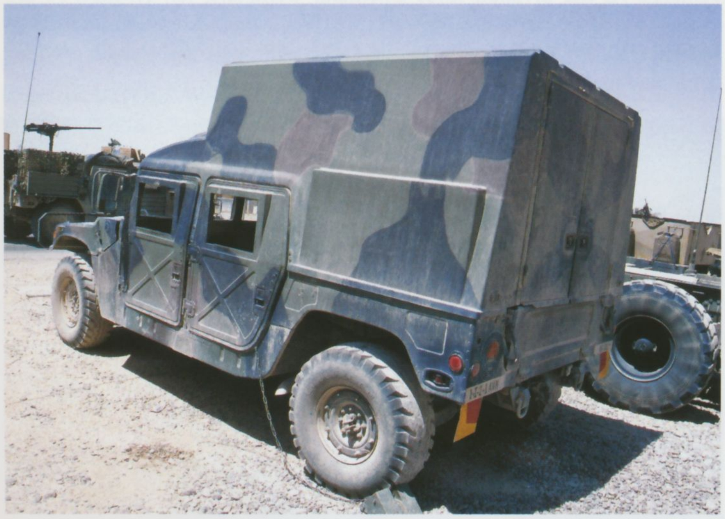
Belonging to a unit of the 3rd Corps Support Command, this two-door soft-top variant of the M998 HMMWV cargo and troop carrier was seen on the outskirts of Baghdad in December 2003.



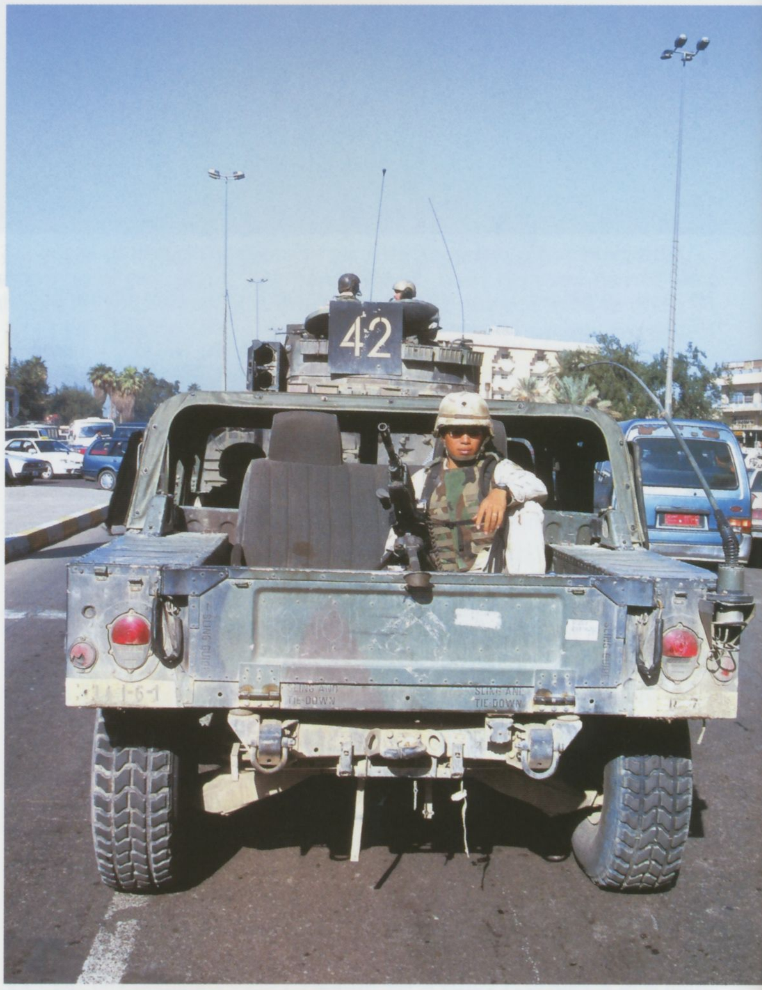
An M998 HMMWV cargo and troop carrier with four doors and a soft-top leads a convoy through an Iraqi city. Like most basic series HMMWVs, the vehicle has been upgraded to an A1 standard, but otherwise there is no sign of an operationally based modification.

A mechanized infantry unit equipped with the M2A2 Bradley Infantry Fighting Vehicle has 26 HMMWVs in its Headquarters and Headquarter Company (HHC). Ten of these are armament carriers or Up-armored HMMWVs, which belong to the Scout Platoon. Each of the three infantry companies of the battalion is also equipped with two HMMWVs, bringing the battalion's total number of HMMWVs to 32. Due to the fact that the basic HMMWV has also been manufactured in the improved A1 and A2 versions, units usually have a mix of different versions in their inventory. The reason for this is that the newer A1 and A2 vehicles are only given to units as replacement vehicles, so only a small number of U.S. army units were entirely re-equipped with new models. In addition to the standard HMMWV models (listed below), the U.S. Army fields a lot of HMMWVs which do not have their own identification number, for example HMMWVs of Psychological Operations units fitted with loudspeaker equipment, or HMMWVs fitted with the Prophet electronic warfare equipment used by Military Intelligence units. Other HMMWVs have been fitted with the "Helmet" hardtop, which in army terms is called the Mobile Radio Communication hardtop.

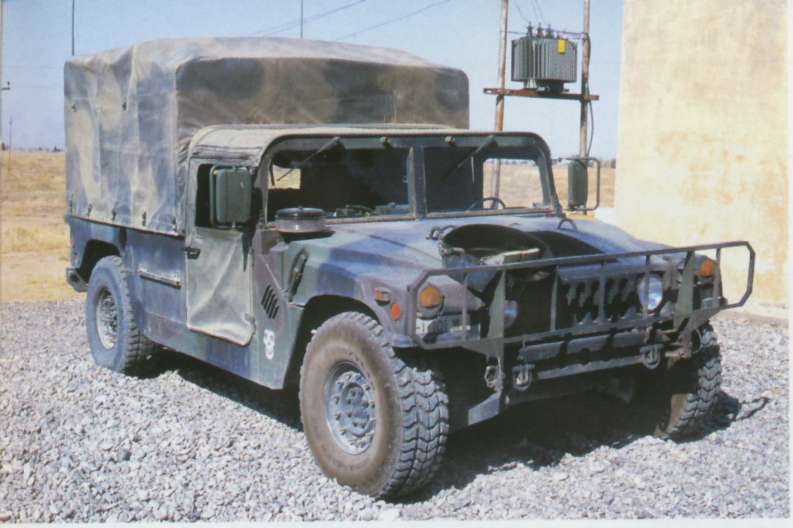
It is impossible to give accurate numbers when it comes to the use of HMMWVs by U.S. units in Iraq. Most armor and mechanized units deployed to Iraq after the initial battle was over, left large parts of their heavy equipment at home. Facing a more guerilla type war, the units on arrival in Iraq were given additional numbers of HMMWVs. These were then modified by the units to suit their needs. Modifications also included the fitting of add-on armor of all sorts. After the deployment of units ended, due to orders, modified vehicles were handed over to the following units. Among the HMMWVs handed over to replacement units were large numbers of M1114 Up-armored HMMWVs. For example, armor battalions received one M1114 Up-armored HMMWV for each main battle tank. In some cases this left a tank company with 12 M1114 Up-armored HMMWVs and only two M1A1 Abrams main battle tanks. The only certain statement that can be made regarding the numbers of HMMWVs used by units is that the total is certainly larger than the numbers that units originally possessed.



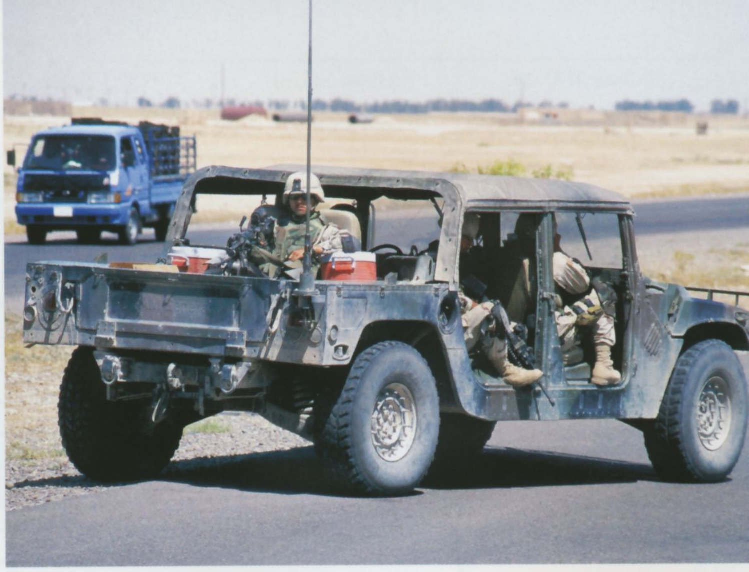
This picture shows an M1038 HMMWV cargo and troop carrier with a winch, from the 2nd Battalion, 1st Aviation Regiment of the 1st (U.S.) Infantry Division. The vehicle was seen at Camp Speicher near Tikrit. The vehicle is fitted with the tall version of the Helmet hardtop, manufactured by Amtech Corporation. The hardtop offers an interior headroom over the cargo bed of 72 inches. The hardtop is mounted on the vehicle together with heavy doors of the basic armor type.



November 2003, Baghdad, and a mixed patrol consisting of two M2A2 ODS Bradleys and two soft-top M998A1 HMMWV cargo and troop carriers with four doors patrol in the city center. The vehicles belong to the 1st Battalion, 6th Infantry Regiment of the 1st (U.S.) Armored Division. Note the seats from a civilian van mounted in the HMMWV's cargo bay to allow the machine gunner a more comfortable seat. The 7.62mm M240B machine gun is mounted on a tripod which is lashed to the cargo rings in the cargo bed.



Belonging to the 101st Military Intelligence Battalion, this vehicle is an M998A1 cargo and troop carrier with a two-door soft-top roof. The vehicle was seen at FOB Summerall in Bayji in June 2004. Note the unit's death head insignia painted on the side of the vehicle. The HMMWV is fitted with a standard brush guard which can be lowered when necessary to open the vehicle's hood.



Belonging to Task Force 1-7 in Bayji, this M998A1 HMMWV cargo and troop carrier with four doors and soft-top was seen during a combat patrol in June 2004. It is interesting that the vehicle has not yet been fitted with any type of add-on armor.

List of U.S. Armed Forces HMMWV Variants

The M998 HMMWV basic series consists of the following versions:

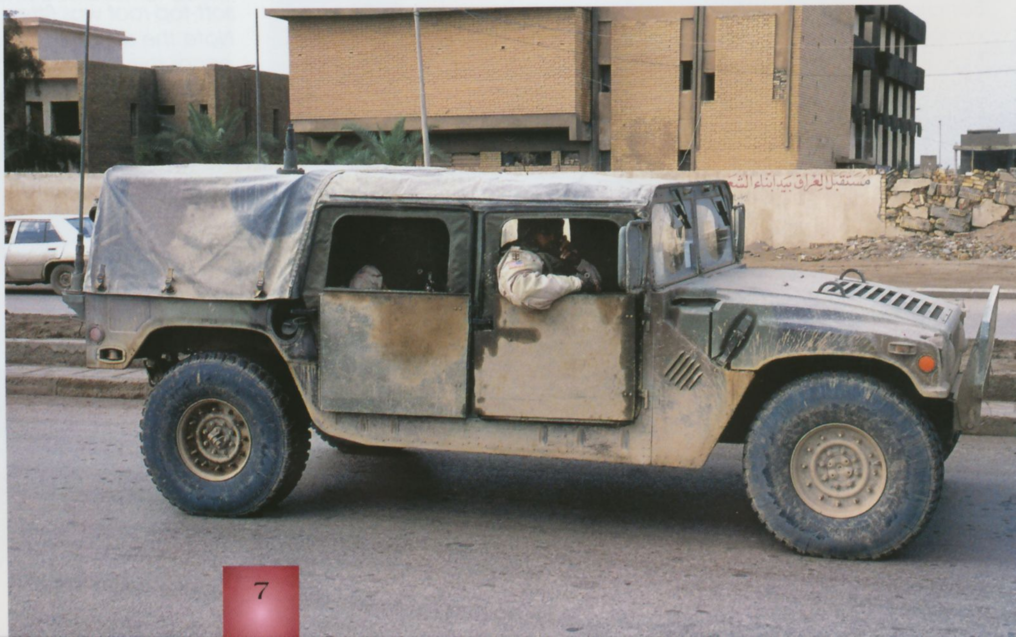
- M998 Cargo and troop carrier
- M1038 Cargo and troop carrier with winch
- M966 TOW Missile carrier with basic armor
- M1036 TOW Missile carrier with basic armor and winch
- M1045 TOW Missile carrier with supplementary armor
- M1046 TOW Missile carrier with supplementary armor and winch
- M1025 Armament carrier with basic armor
- M1026 Armament carrier with basic armor and winch
- M1043 Armament carrier with supplementary armor
- M1044 Armament carrier with supplementary armor and winch
- M997 Maxi-Ambulance with four stretchers and basic armor
- M996 Mini-Ambulance with two stretchers and basic armor
- M1035 Soft-top Ambulance with two stretchers
- M1037 Shelter carrier
- M1042 Shelter carrier with winch
- M1069 Prime mover
- M1097 HHV (Heavy Hummer Variant), a modified version of an armament carrier with increased gross vehicle weight
- Avenger based on the M1037 Shelter carrier

The M998A1 HMMWV series consists of the following versions:

- M998A1 Cargo vehicle
- M1038A1 Cargo vehicle with winch
- M966A1 TOW Missile platform with basic armor
- M1045A1 TOW Missile platform with supplementary armor
- M1046A1 TOW Missile platform with supplementary armor and winch
- M1025A1 Armament carrier with basic armor
- M1026A1 Armament carrier with basic armor and winch
- M1043A1 Armament carrier with supplementary armor
- M1044A1 Armament carrier with supplementary armor and winch
- M997A1 Maxi-Ambulance with four stretchers and basic armor
- M1035A1 Ambulance with soft-top and two stretchers
- M1097A1 HHV (Heavy Hummer Variant)
- M1069A1 Prime mover
- M1109 Up-armored HMMWV

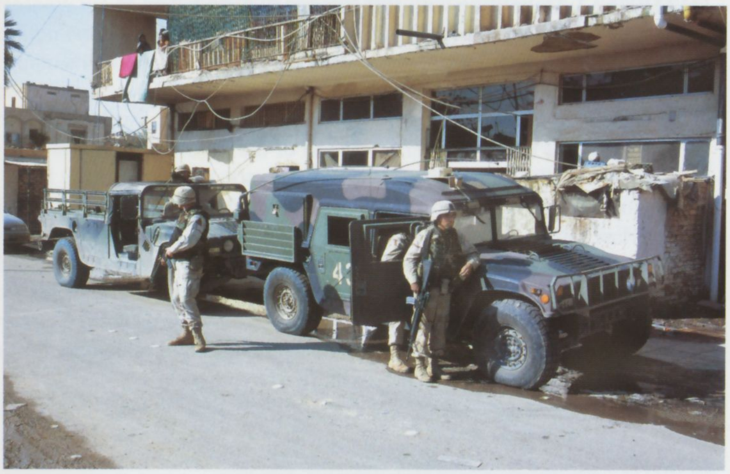
The M998A2 HMMWV series consist of the following versions:

- M1097A2 HHV (Heavy Hummer Variant) available as a basic platform, cargo and troop carrier with optional hardtop, shelter carrier or prime mover.
- M1025A2 Armament carrier with basic armor
- M1043A2 Armament carrier with supplementary armor
- M1045A 2 TOW Missile carrier with supplementary armor
- M997A2 Maxi-Ambulance with four stretchers and basic armor
- M1035A2 Soft-top Ambulance with two stretchers
- M1113 Expanded Capacity Vehicle (ECV)
- M1114 Up-armored HMMWV
- M1116 Up-armored HMMWV for the USAF

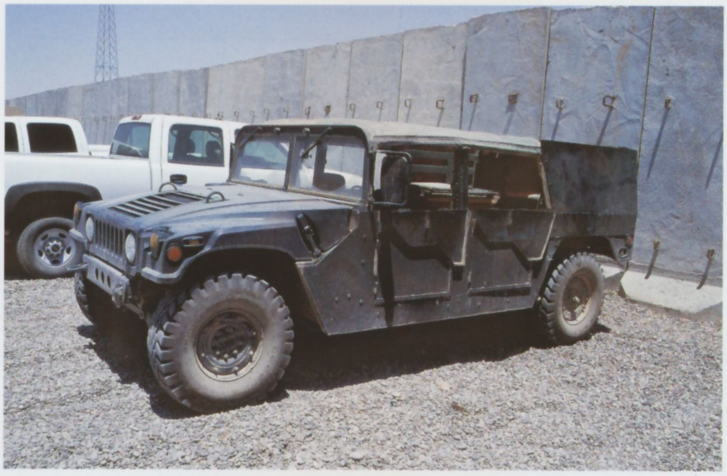


One of the basic versions of the HMMWV is the M998A1 HMMWV cargo and troop carrier, and here such a vehicle can be seen with the four-door soft-top roof. Over the canvas doors some metal plates have been mounted in order to provide some protection for the crew. The vehicle belongs to an unknown transport unit and was seen leading a convoy passing through Al Diwanja in November 2003.

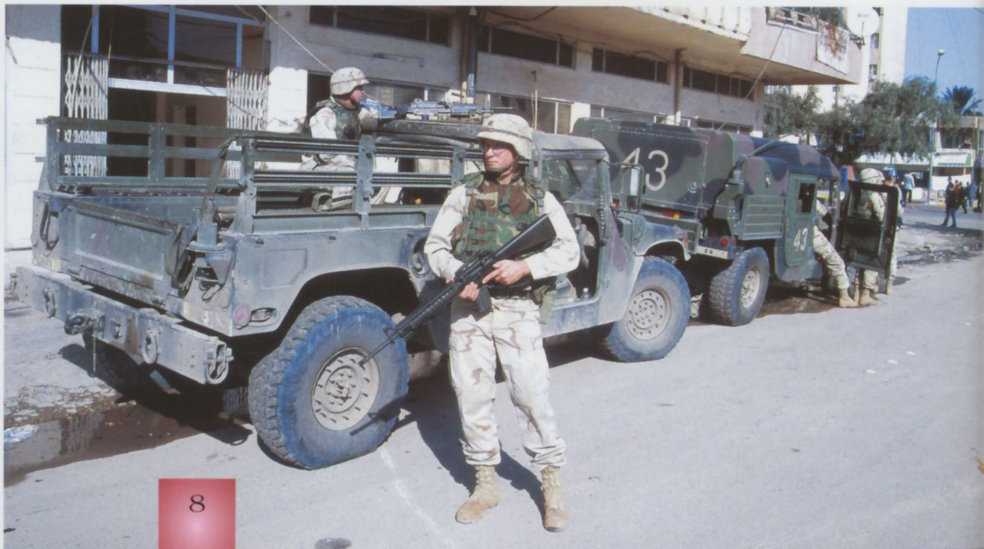
Technical Data	M998 Series	M998A1 Series	M998A2 Series (M1097A2 Cargo troop carriers)	M1114 Up-Armored HMMWV	M1113 Expanded Capacity Vehicle HMMWV
Engine:	6.2 liter naturally aspirated V8 Diesel		6.5 liter naturally aspirated V8 Diesel, EPA Compliant	6.5 liter Turbocharged V8 Diesel, EPA Compliant	
Horsepower:	150 HP at 3,600RPM		160 HP at 3,400RPM	190 HP at 3,400RPM	
Maximum road speed:	105km/h		113km/h	125km/h	
Curb weight:	2,359kg	2,444kg	2,676kg	4,447kg	2,903kg
Payload:	1,134kg	1,030kg	1,996kg	1,043kg	2,313kg
Gross vehicle weight:	3,493kg	3,574kg	4,672kg	5,489kg	5,216kg
Fuel tank capacity:	94 liters				
Seating capacity:	1+1 (+8)			1+3	1+1 (+8)
Wheelbase:	3.3m				
Overall length:	4.58m		4.84m	5m	
Overall width:	2.3m (2.18m with mirrors folded)				
Height to top of hull:	1.88m		1.83m	1.93m without weapons mounted	1.93m without shelter
Track width:	1.82m				
Ground clearance:	0.43m				
Turning radius:	7.62m				
Angle of approach:	47°		54°	45°	46°
Angle of departure:	45°		38°	35°	41°
Cruising range:	563km	482km	443km		
Fording depth:	0.76m (with additional kit 1.52m)				
Transmission:	General Motors THM 400 3-speed automatic transmission		General Motors 4L 80E 4- speed automatic transmission		



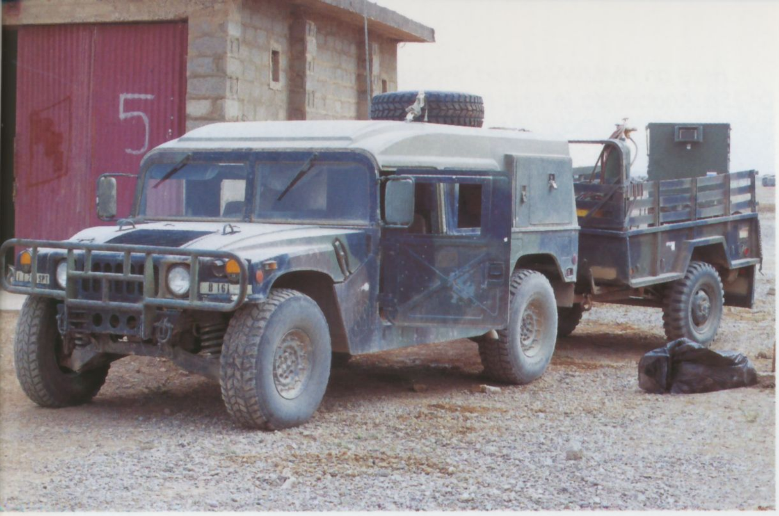
This M998A1 HMMWV belongs to the 1st Battalion, 6th Infantry Regiment of the 1st (U.S.) Armor Division. The vehicle is fitted with the Mobile Radio Communication hardtop manufactured by Amtech Corporation. The hardtop has a weight of 417lbs and can be fitted to vehicles with hard or soft tops. The vehicle in the picture is fitted with the basic armor doors of the HMMWV armament carriers. In the rear, an M1038A1 HMMWV cargo and troop carrier with winch and two-door soft top enclosure of the same unit can be seen.



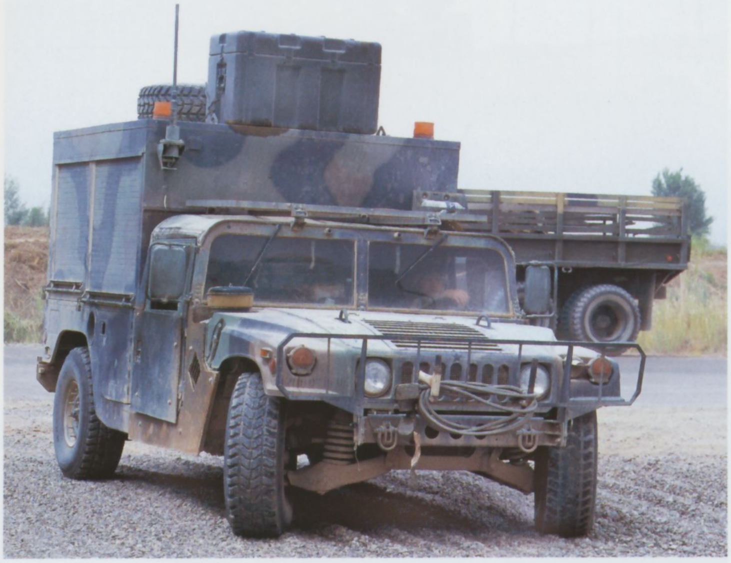
This M998A1 HMMWV cargo and troop carrier with four doors and soft-top roof was fitted at the unit level with improvised add-on armor. Note the side armor panels, the armor protected half doors, and the armor shields enclosing the cargo bay of the vehicle.



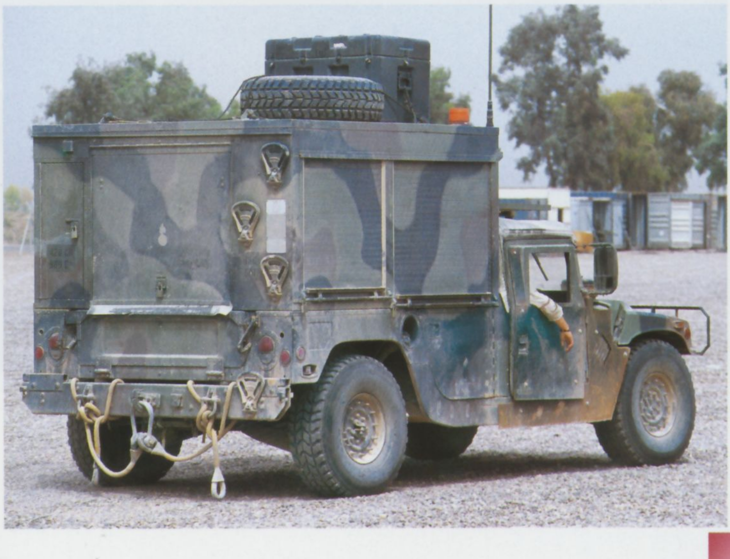
This M1038A1 HMMWV cargo and troop carrier with winch and two-door soft-top was pictured while on duty in the city of Baghdad in December 2003. The vehicle belongs to 1st Battalion, 6th Infantry Regiment of the 1st (U.S.) Armored Division. In 2003, most HMMWV of the U.S. Army in Iraq were operated by troops without any additional armor protection.

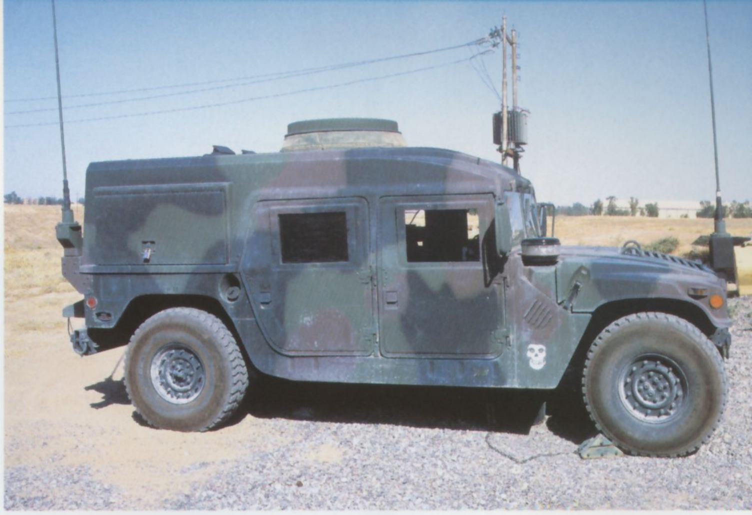


This M998A1 HMMWV cargo and troop carrier of the maintenance element of Task Force 1-77 is fitted with the Mobile Radio Communication hardtop. Initially designed for communication vehicles, the MRC hardtop today sees widespread service wherever U.S. troops think that their HMMWV soft-tops do not provide troops or equipment enough protection from the environment. On either side in the rear of the hardtop, a side storage compartment is situated which can be accessed by a hatch. The hardtop is made of fiberglass and has reinforced areas where antennas can be mounted.

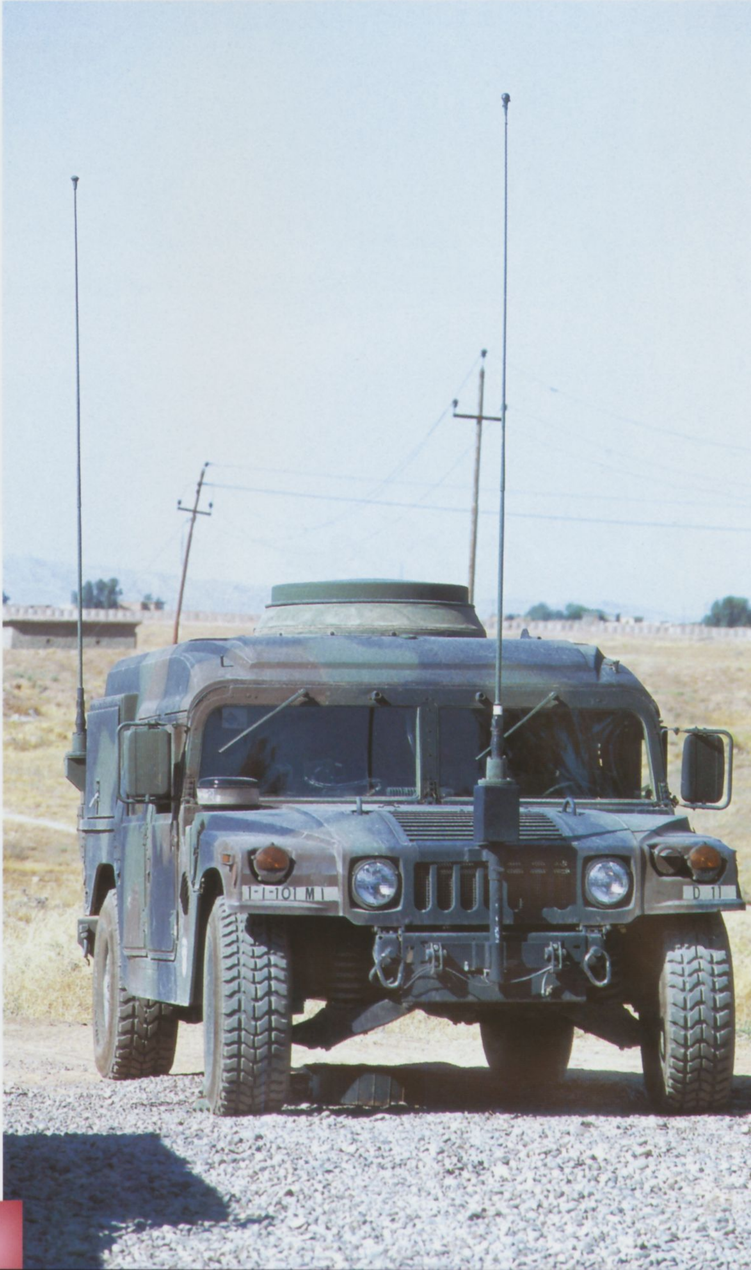


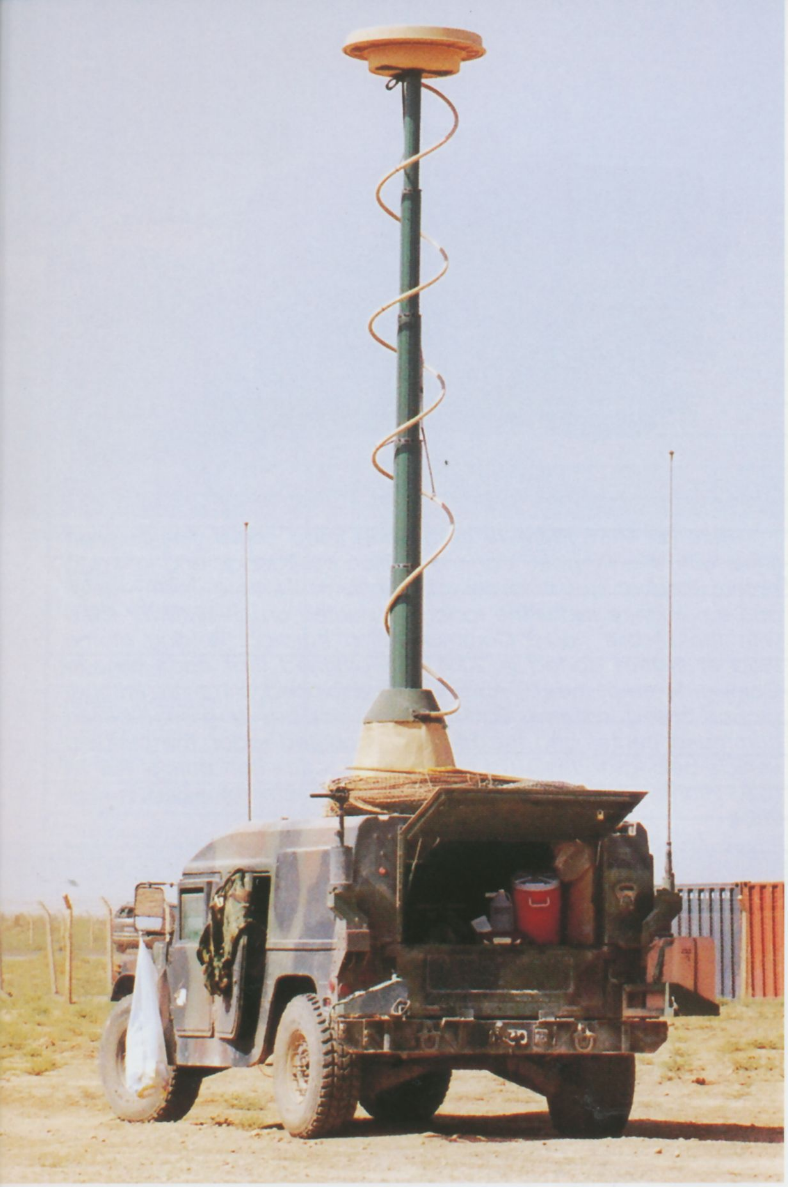
In maintenance units of the U.S. Army, the M1037 HMMWV Shelter Carrier is used as a workshop vehicle. In the container mounted on the vehicle is an impressive selection of tools, including a welding kit. The vehicle is fitted with ad hoc add-on armor and basic armor doors fitted with additional steel plates.



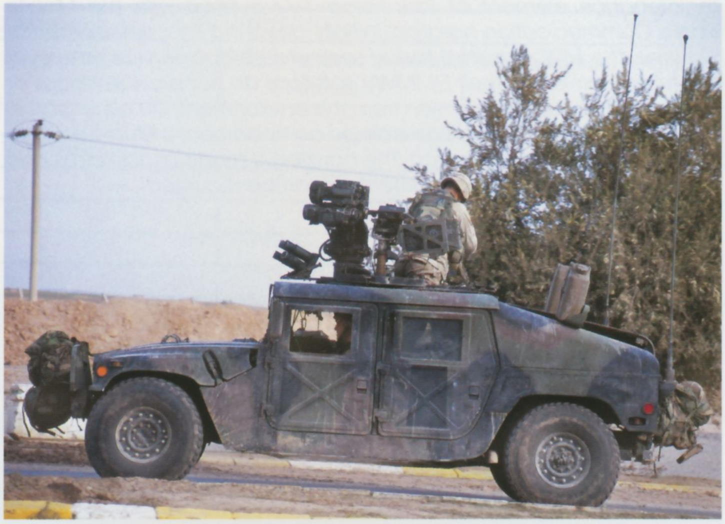


Here an M998 HMMWV cargo and troop carrier can be seen fitted with the "Prophet" communication intelligence and jamming system. Prophet is used to detect, identify and locate enemy radios and surveillance radar. The radar is mounted on an HMMWV fitted with the Mobile Radio Communication hardtop. Fielding of the Prophet system started in 2004. It is planned that each Brigade Combat Team of the U.S. Army will be equipped with three Prophet ground-based systems. Each system includes a ground-based command center and the HMMWV mounted radar. The pictured vehicle belongs to the 101st Military Intelligence Battalion, of the 1st (U.S.) Infantry Division, and was seen at FOB Summerall in Bayji in June 2004.

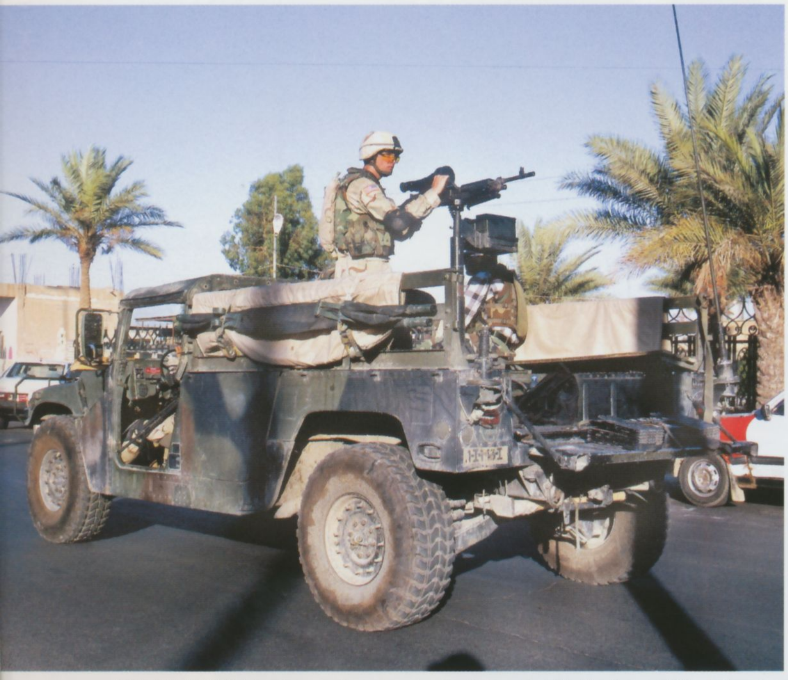




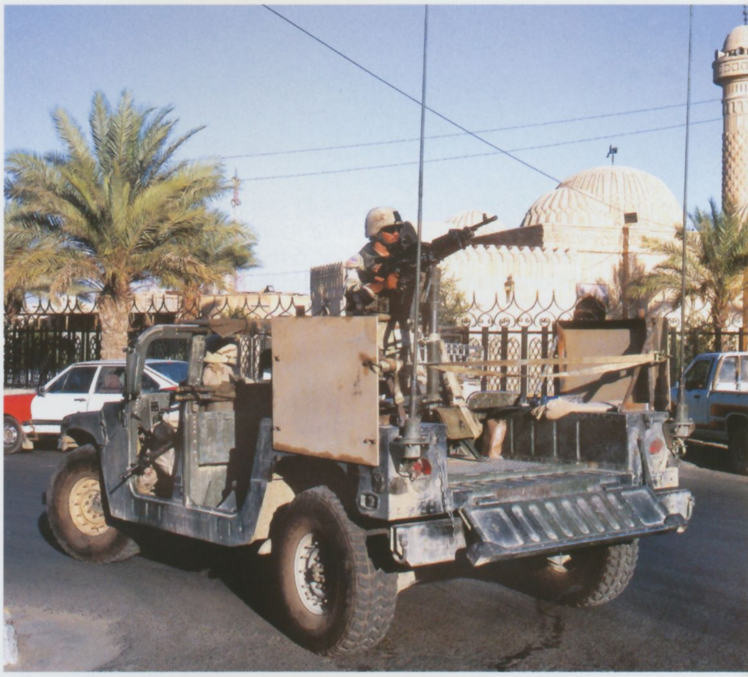
Here an HMMWV-based "Prophet" radar can be seen deployed at LSA Anaconda in Iraq in June 2004. The vehicle's radar mast is raised, and the radar is providing information on communications between groups of Iraqi resistance fighters. The "Prophet" radar system AN/MLQ-40(V)2 consists of a PDR 13 receiver that scans the airwaves from 20MHz to 2000MHz and the AN/TLQ-17 jammer that can block enemy transmissions from 1.5MHz to 80MHz.



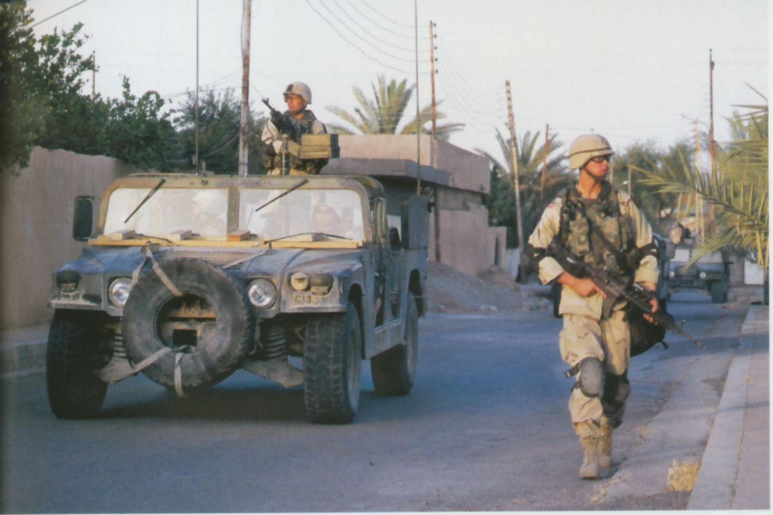
This M966A1 HMMWV TOW missile platform with basic armor was seen on patrol in Mosul in December 2003. The vehicle belongs to a unit of the 101st (U.S.) Airborne Division ("Screaming Eagles"). Note that the launch tube for the missile has been removed.

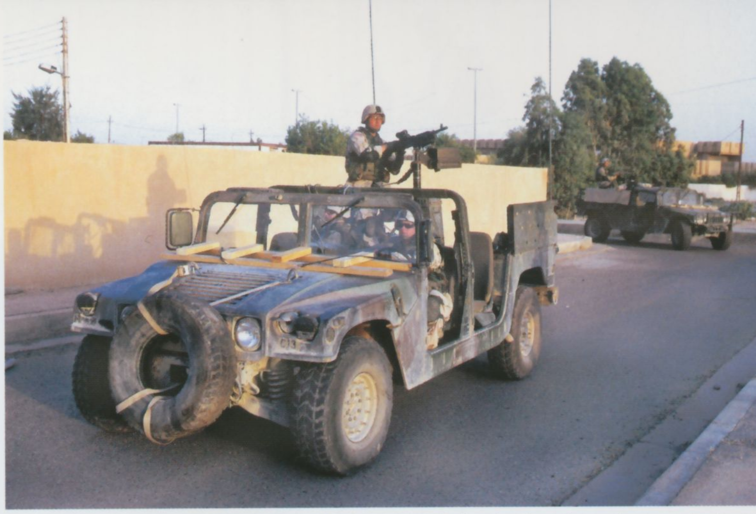


This HMMWV belongs to a patrol of the 1st Battalion, 18th Infantry Regiment, and was seen during a patrol in Tikrit. The vehicle is an M1097A2 Heavy Hummer Variant in the cargo and troop carrier variant. Note the Kevlar blankets fitted to the vehicle's benches in order to protect passengers from the effects of shrapnel and small arms fire.



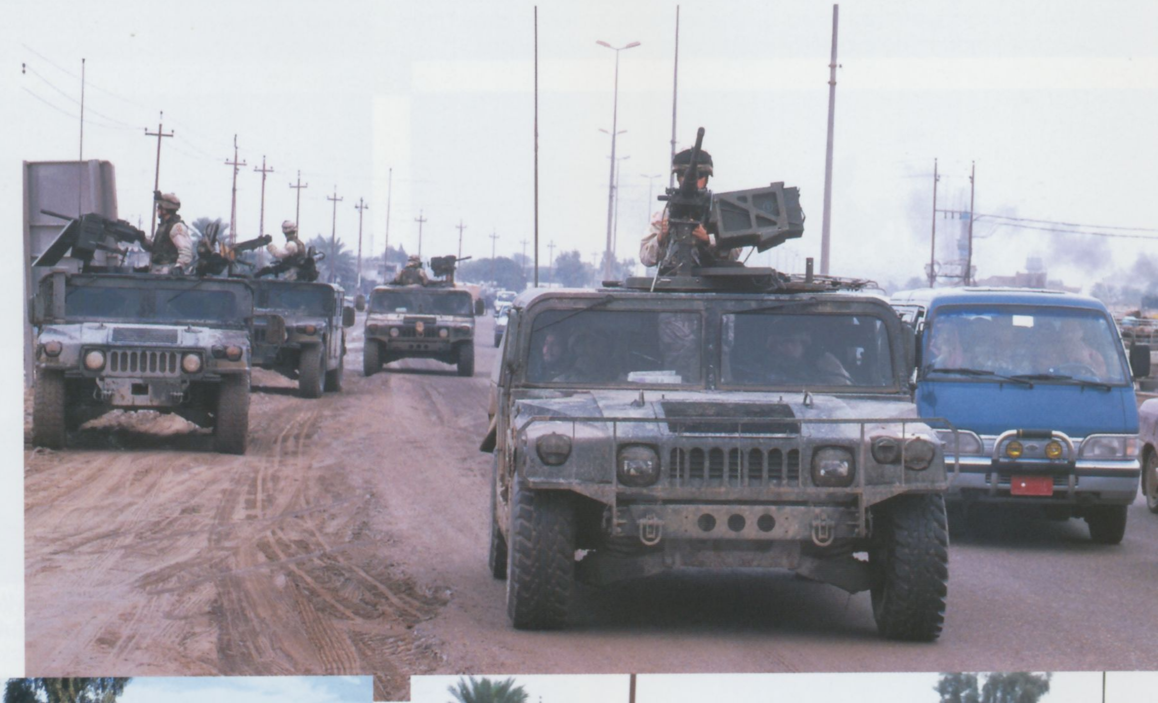
Here is another rear view of an M1097A2 Heavy Hummer Variant in the cargo and troop carrier format. It is from the 1st Battalion, 18th Infantry Regiment, on patrol in Tikrit in June 2004. In the cargo bed of the HMMWV, a 7.62mm M240B machine gun is mounted. While the vehicle is stripped of as much equipment as possible, the cargo bed is protected by two steel plates mounted on the sides of the vehicle.

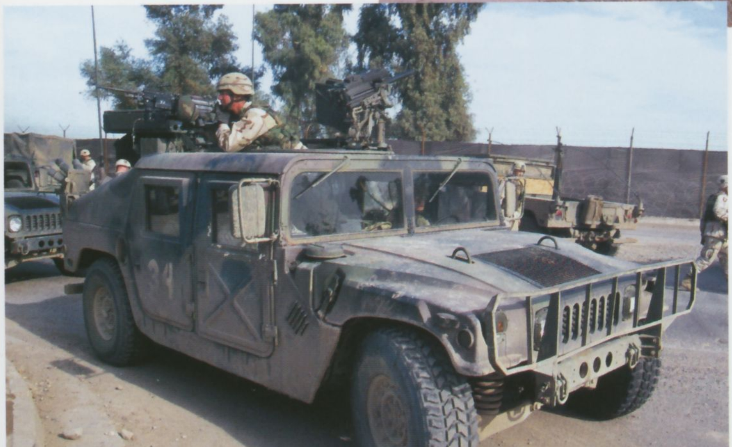




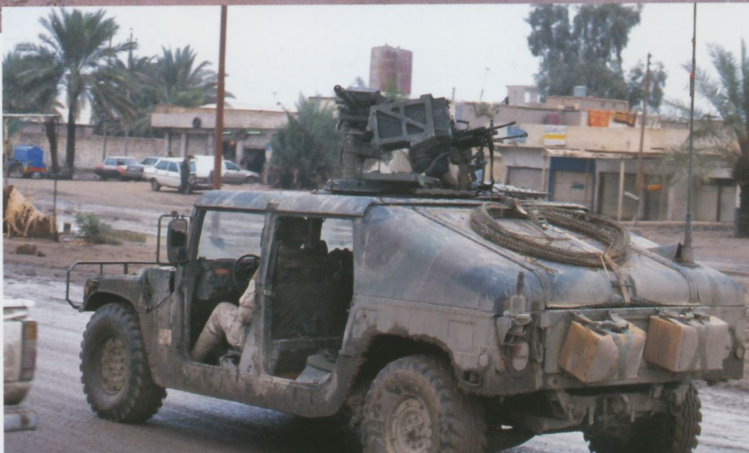
These two pictures show an M1097A2 Heavy Hummer Variant cargo and troop carrier of the 1st Battalion, 18th Infantry Regiment on patrol in Tikrit in June 2004. As the troops need to quickly get in and out of the vehicle, the HMMWV is stripped of superfluous fittings as much as possible. Only some additional armor plates have been mounted along the cargo bed of the HMMWV in order to add some protection for the machine gunner. In the cargo bed a 7.62mm M240B machine gun is mounted. Note the wooden ladder placed on the hood of the vehicle and the tire mounted on the vehicle's front, acting as a soft bumper.

In December 2003, this M1025 HMMWV armament carrier with basic armor was seen leading a combat patrol in Al Iskanderiyah. The vehicle belongs to a unit of the 10th (U.S.) Mountain Division and is armed with a 12.7mm M2A2 HB machine gun.

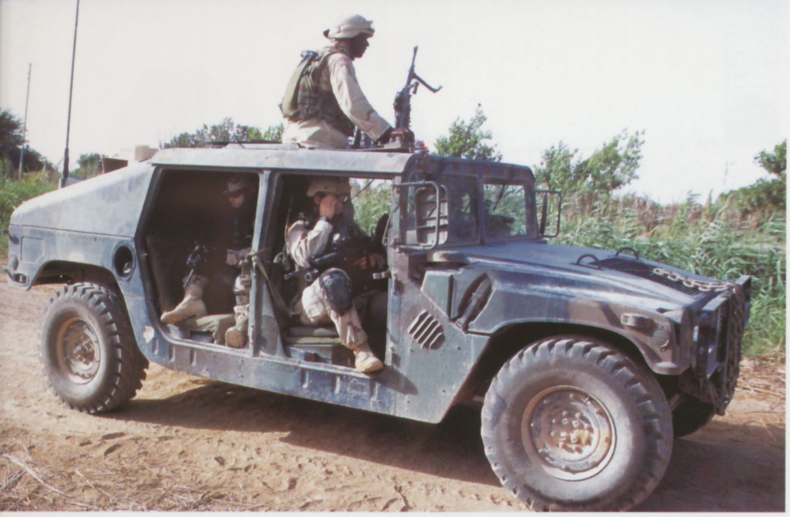




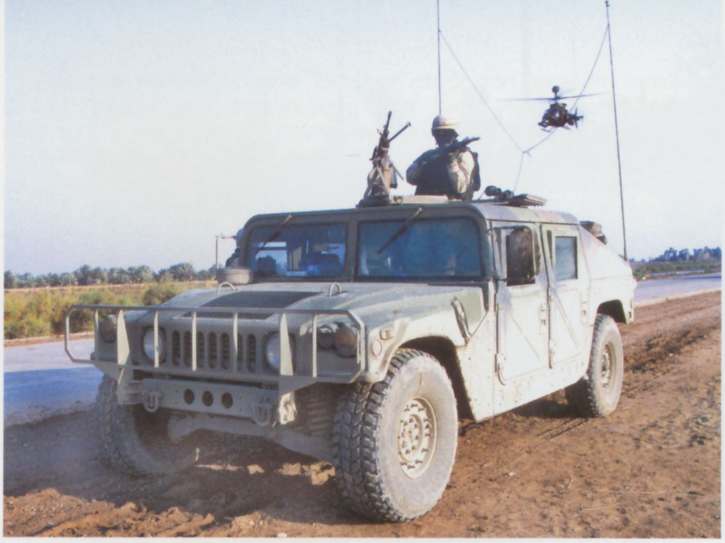
This M1025 HMMWV armament carrier with basic armor belongs to a unit of the 2nd Brigade Combat Team of the 101st (U.S.) Airborne Division ("Screaming Eagles"). The vehicle was seen on patrol in Mosul in December 2003. The vehicle is well armed with a 40mm Mk.19 automatic grenade launcher and a 5.56mm M249 SAW light machine gun.



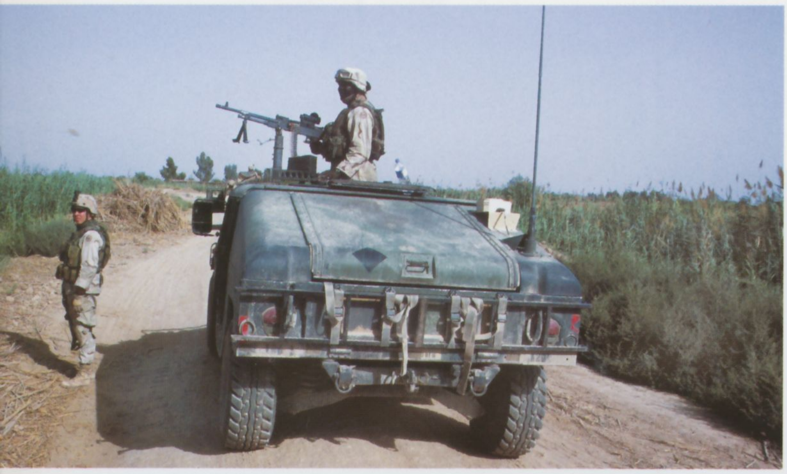
Another view of an M1025 HMMWV armament carrier with basic armor of a unit from the 10th (U.S.) Mountain Division. The vehicle is armed with a 40mm Mk.19 grenade launcher and a 5.56mm M249 SAW light machine gun. The vehicle is part of a patrol of an infantry unit which is searching for hidden IEDs in Al Iskanderiyah in November 2003.



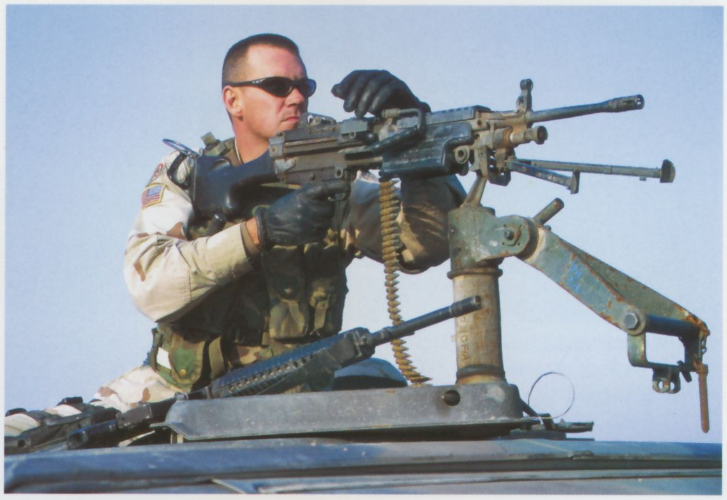
An M1025 HMMWV armament carrier with basic armor of the 1st Battalion, 18th Infantry Regiment, can here be seen during a patrol in Tikrit in June 2004. The vehicle has been fitted with a brush guard and is armed with a 7.62mm M240B machine gun. A night sight can be seen on this weapon which indicates that the pictured patrol will stay out on the dangerous streets of Tikrit into the hours of darkness. The HMMWV's doors were removed by the crew in order to allow the soldiers to dismount more quickly while conducting operations.



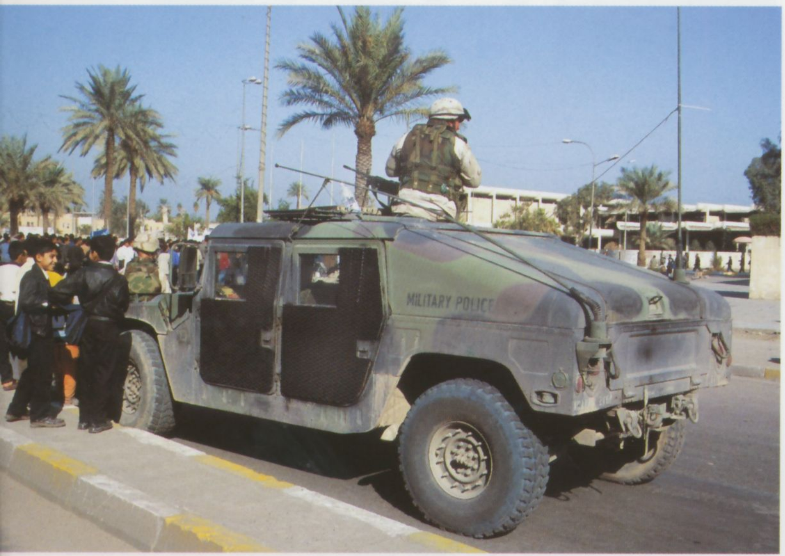
Before the M1114 Up-armored HMMWV entered service, the M1025 HMMWV armament carrier with basic armor was the standard transport for U.S. military police. Here an M1025 HMMWV of the 220th Military Police Company can be seen guarding a traffic accident site south of Al Diwaniyah. Additional security is provided by an OH-58D (I) Kiowa Warrior helicopter of a Cavalry unit, which can just be seen passing by in the background.

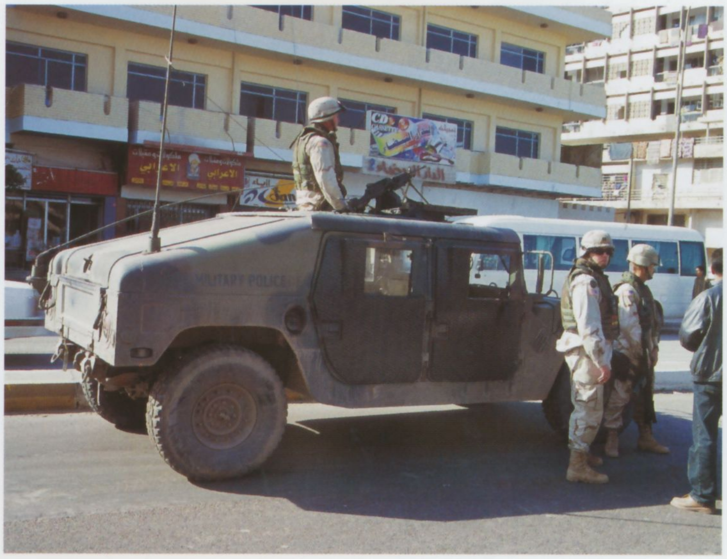


This M1025 HMMWV armament carrier with basic armor belongs to the 2nd Battalion, 108th Infantry Regiment of the New York Army National Guard. The unit deployed to Iraq in support of the 1st (U.S.) Infantry Division and operates in the southern region of the division's AOR.



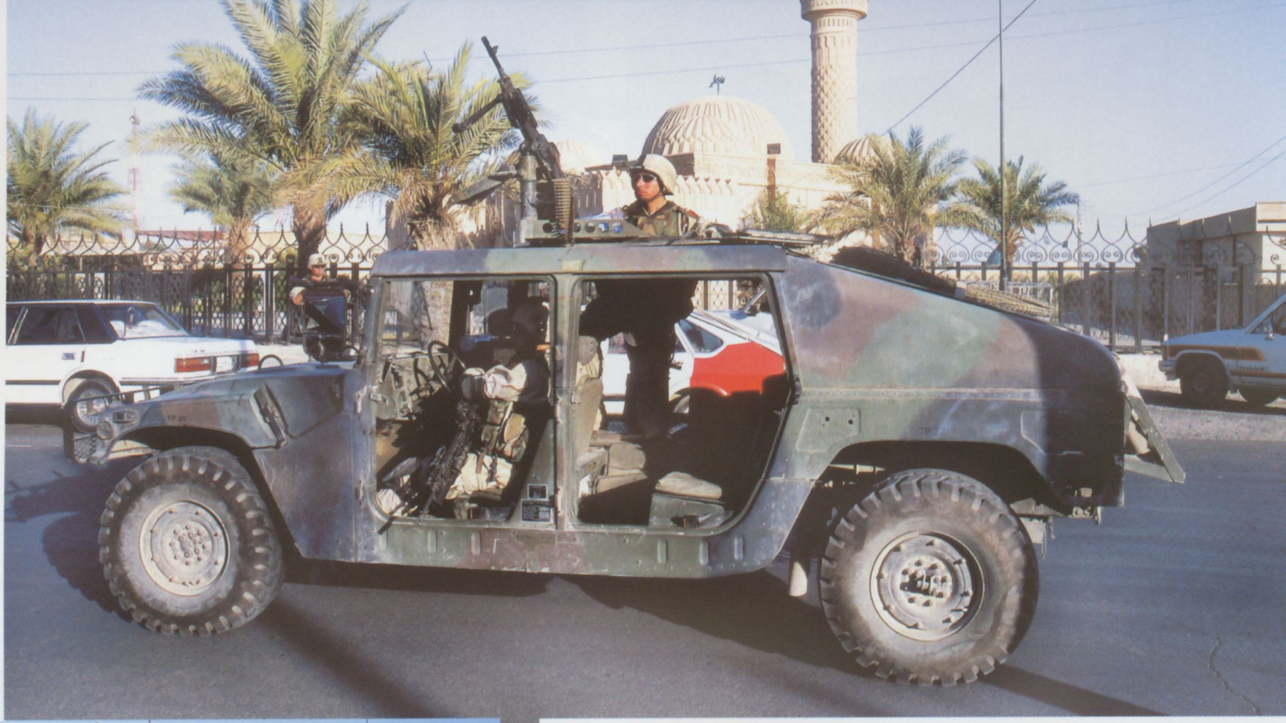
From the roof of an M1025 HMMWV armament carrier with basic armor, a military policeman carefully scans the countryside while his comrades investigate a traffic accident. The MP is here armed with a 5.56mm M249 SAW light machine gun.

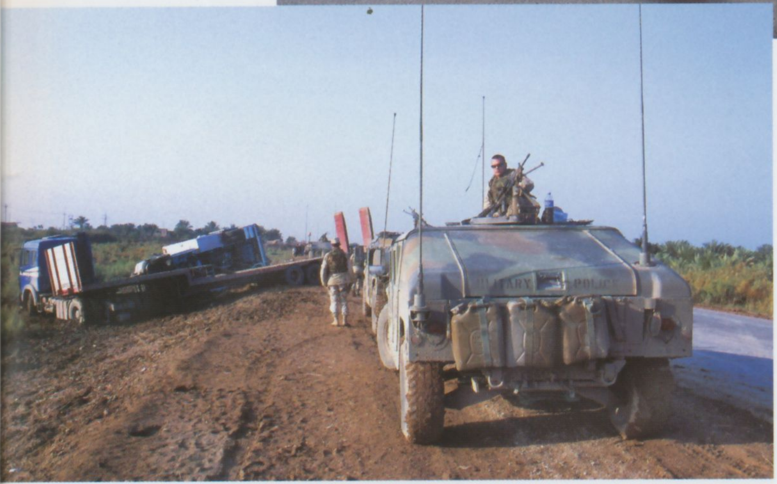




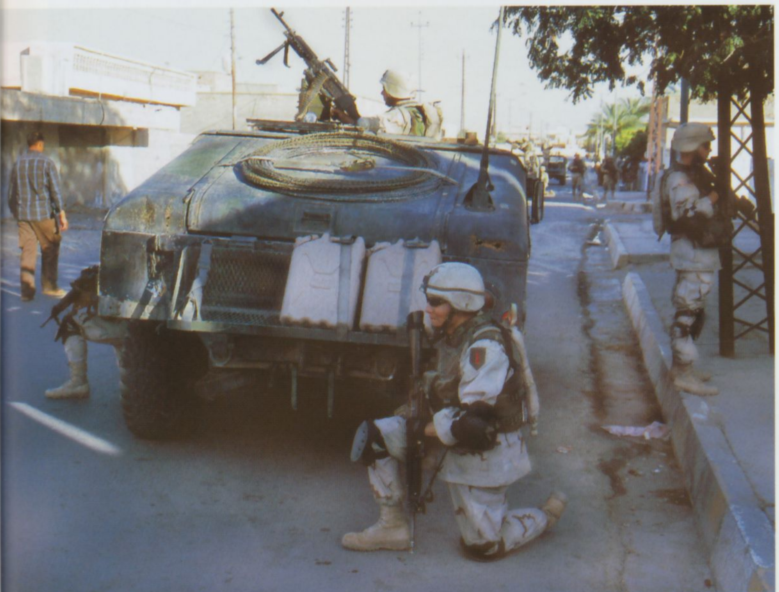
December 2003, Baghdad. While a demonstration is underway in the city center, U.S. Army units belonging to the 1st (U.S.) Armored Division provide protection for the peaceful protest. The M1025 HMMWV armament carrier with basic armor belongs to a Military Police Company of the North Carolina Army National Guard attached to the division. Note the bolted on steel plates which were added to the basic armor doors for additional protection.

Here an M1025 HMMWV armament carrier with basic armor of the 1st Battalion, 18th Infantry Regiment, can be seen on patrol in Tikrit in June 2004. The doors of the vehicle have been removed.

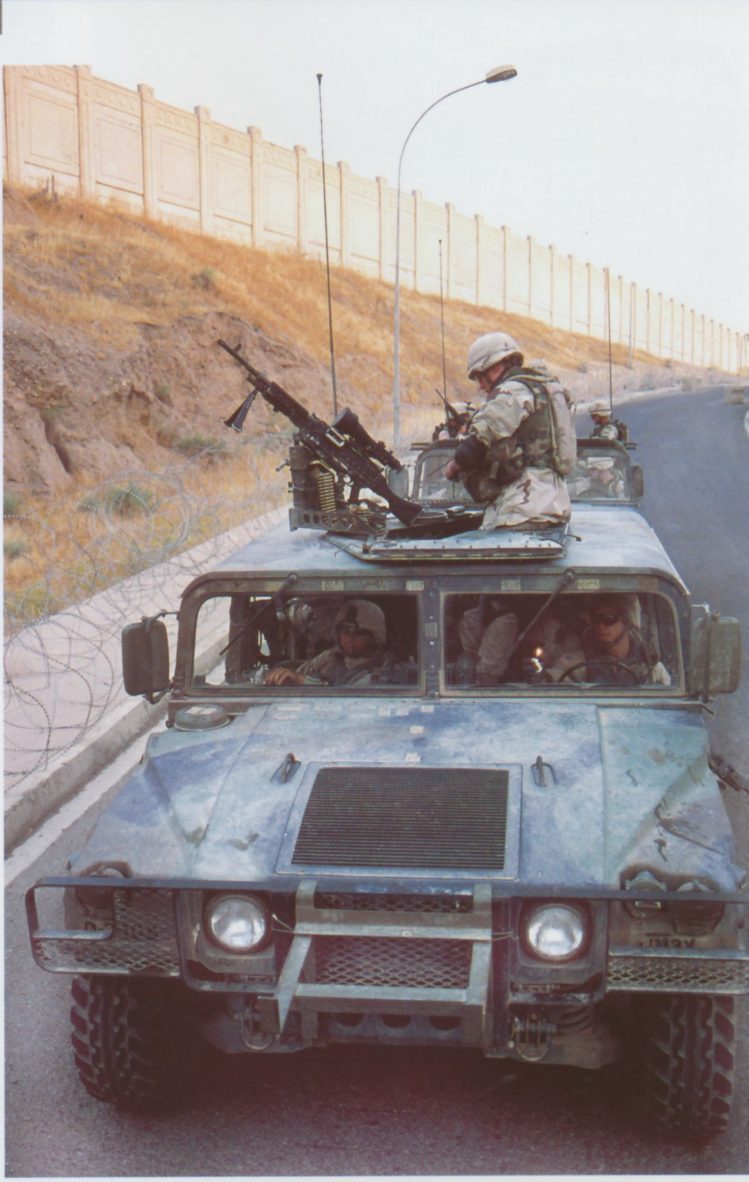




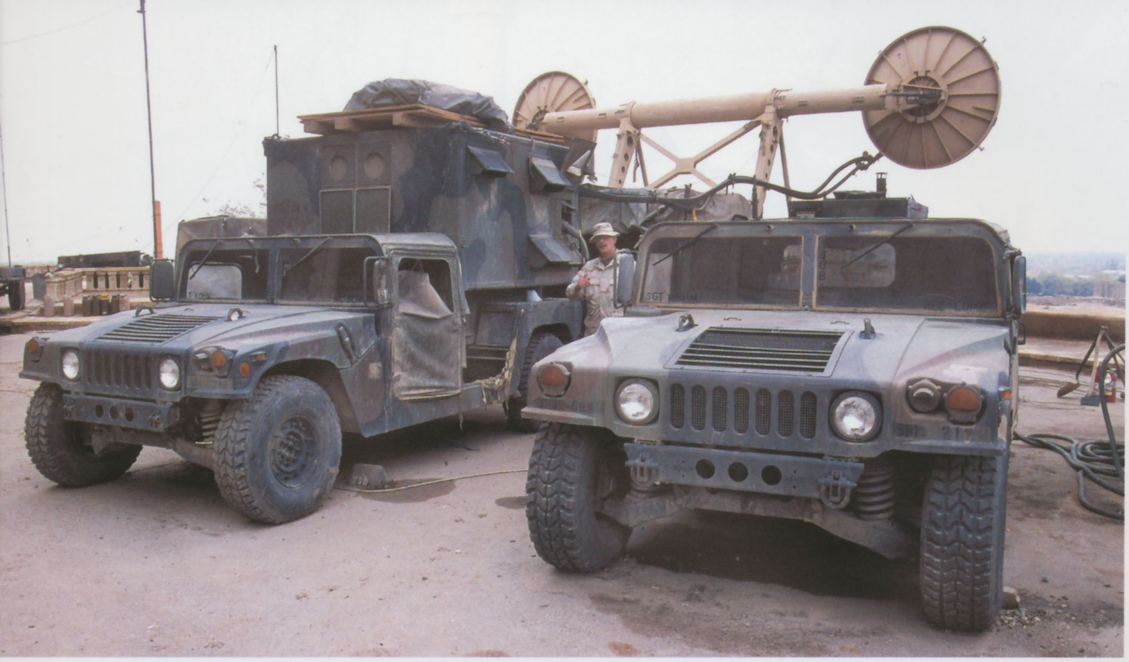
This rear view shows an M1025 HMMWV armament carrier with basic armor of the 220th Military Police Company. The vehicle was seen south of Al Diwaniyah in November 2003. Note the four fuel canisters strapped to the rear of the vehicle.



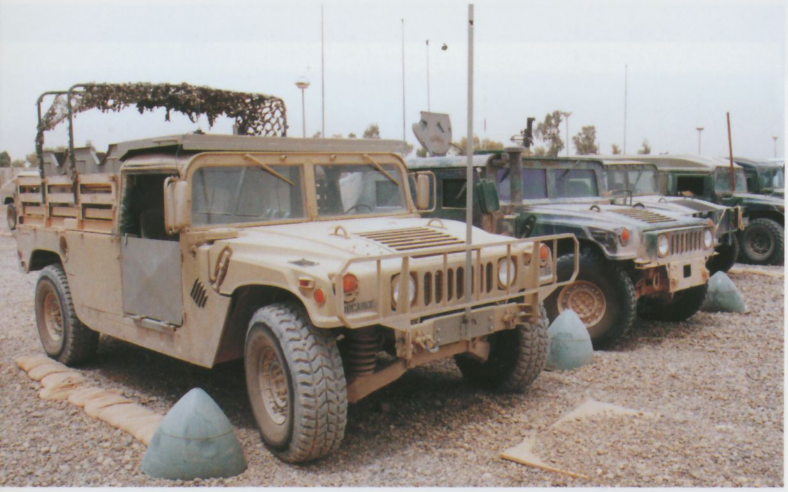
Rear view of an M1025 HMMWV armament carrier with basic armor of the 1st Battalion, 18th Infantry Regiment. Note the storage rack which has been added to the rear of the vehicle in order to allow easier loading and unloading of fuel and water cans.



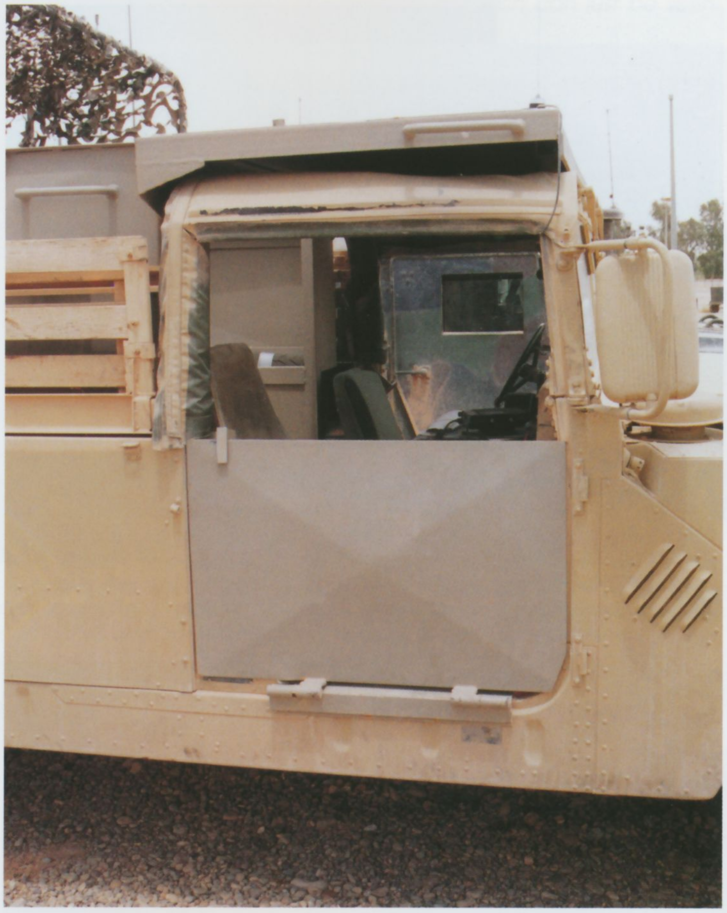
A patrol of the 1st Battalion, 18th Infantry Regiment returns to its base at the palace of Saddam Hussein in Tikrit in June 2004. The first vehicle is an M1025 HMMWV armament carrier with basic armor, and the vehicle is armed with a 7.62mm M240B machine gun fitted with a night vision device.

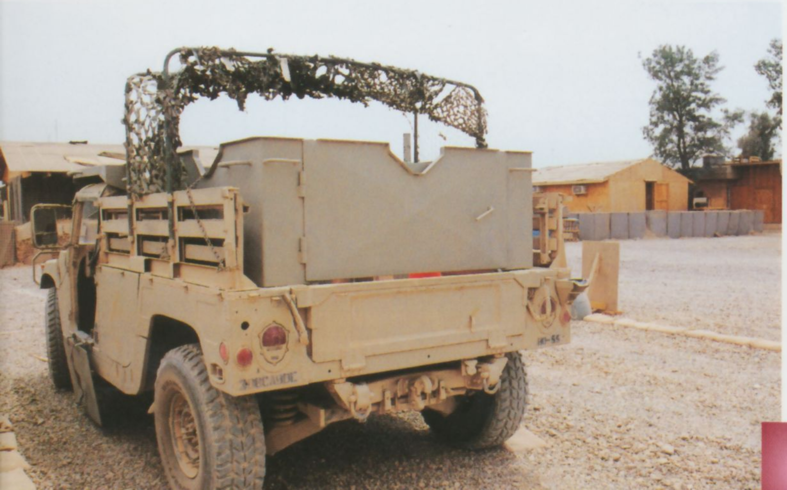


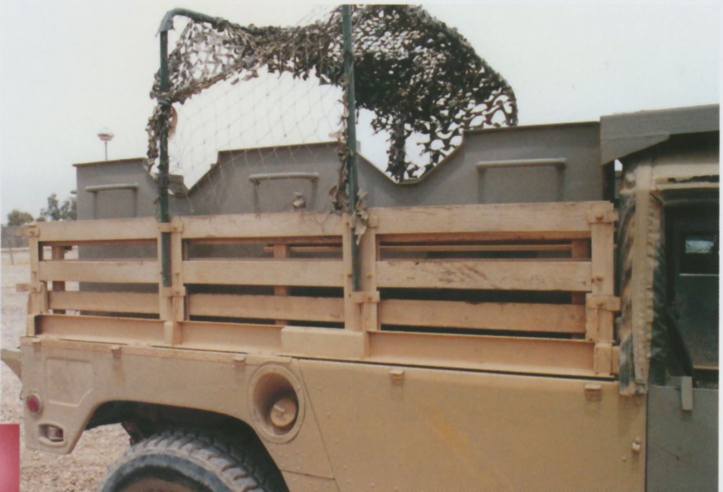
In U.S. Army signal units, the HMMWV is used to carry the S250 shelter as well as other signals equipment. On the left an M1037 HMMWV fitted with the S250 electrical equipment shelter can be seen. The vehicle on the right is also an M1037 HMMWV shelter carrier but in this case the vehicle carries a generator.

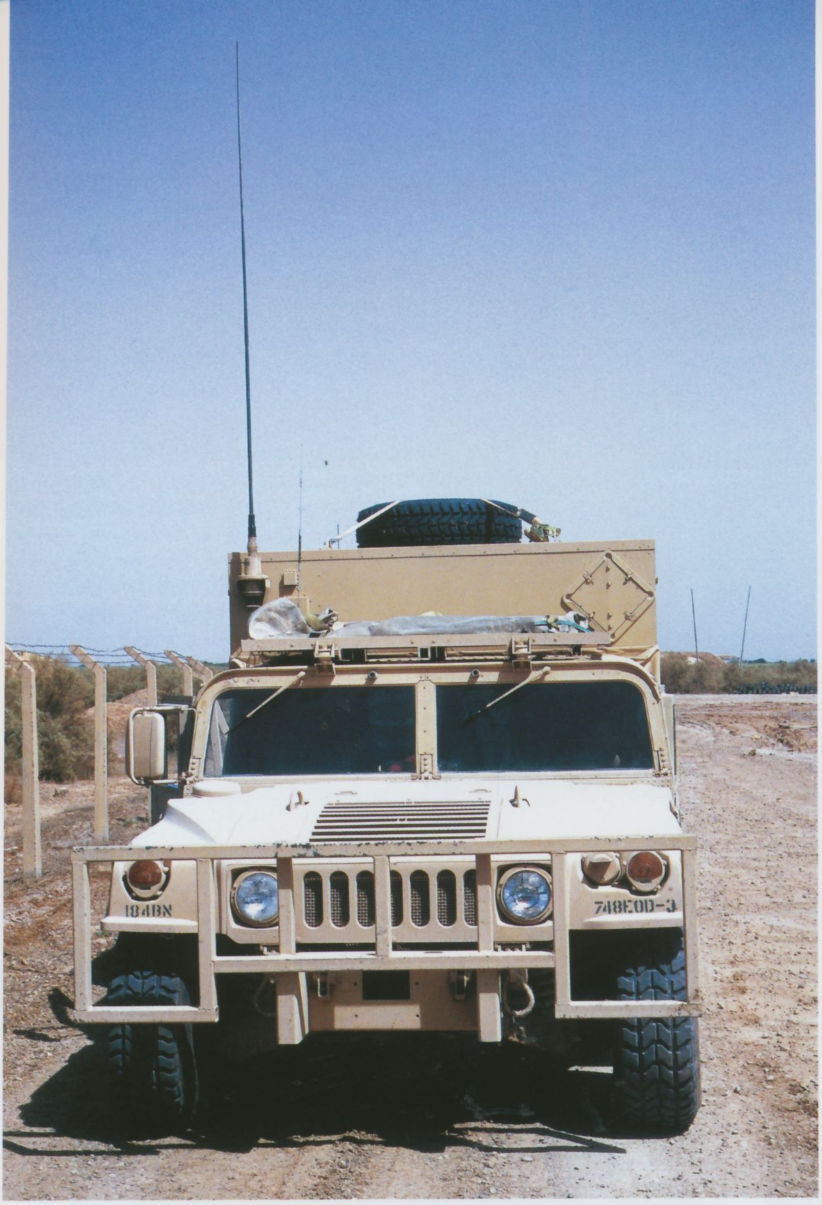


This M998A1 HMMWV cargo and troop carrier in the two-door pickup configuration from an unidentified unit of the 1st (U.S.) Infantry Division, has been converted into a gun truck. The soft-top enclosure for the crew cab has been fitted with a steel plate kit for additional protection. In the cargo bay of the vehicle an armored fortress is placed. The walls of the box have machine gun mounts attached. They can be fitted with 7.62mm M240B machine guns, 5.56mm M249 SAW light machine guns or 40mm Mk.19 Mod 3 automatic grenade launchers. The vehicle was seen at Camp Anaconda in May 2004. It is believed that the kit is called Modified Protection for non-Armored HMMWVs (MPAH), and that the armor kit was designed by Captain Butler of the 354th Civil Affairs Brigade. The kit is available for two-door and four-door HMMWVs, and includes armor plates for the doors and floor, a roof assembly and the fortress for the cargo bay. In total there are 25 pieces with a weight of more than 900lbs. The GIs nicknamed such equipped vehicles as "Butler Mobiles".

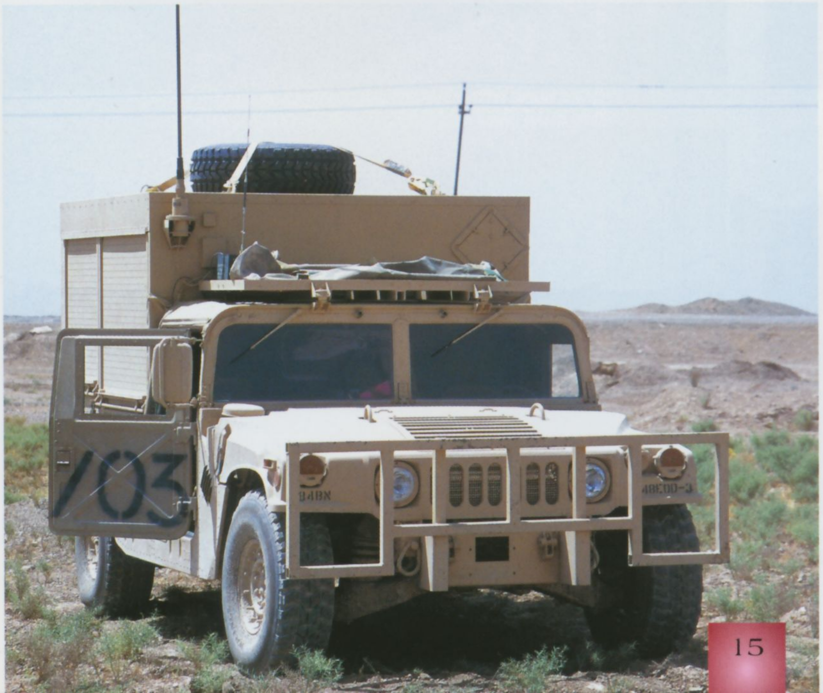


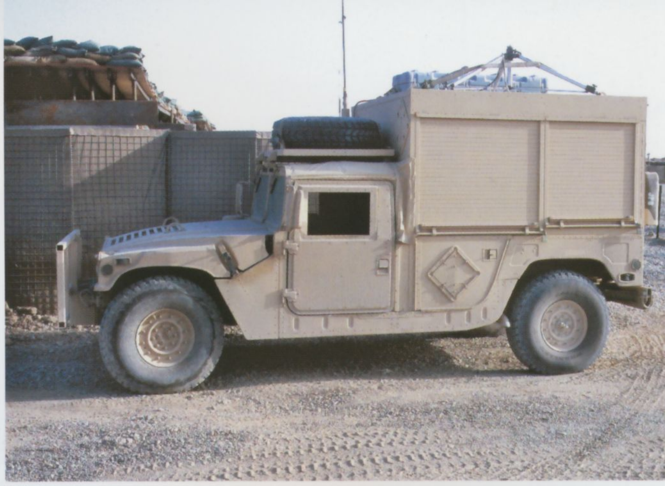


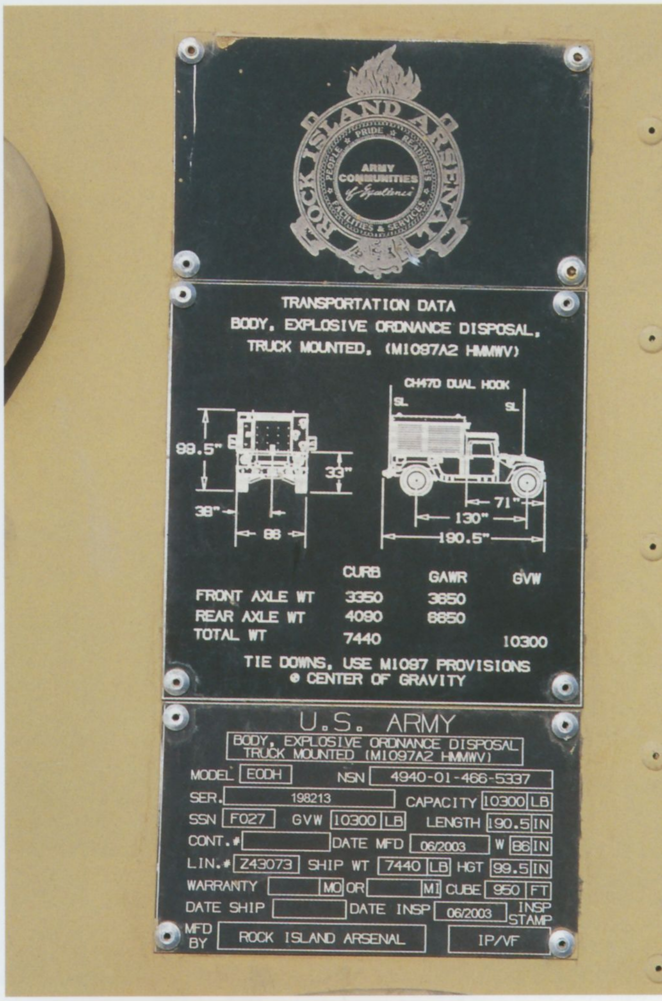




This M1097A2 HMMWV HHV (Heavy Hummer Variant) is fitted with a special body called "Body, Explosive Ordnance Disposal, Truck-Mounted". The body is produced by the Rocky Island Arsenal and contains all the specialist kit of an EOD team. The kit includes EOD suits and an EOD robot, as well as explosives, various tools and electronic equipment. The vehicle belongs to 748th Ordnance Company of the 184th Ordnance Battalion. In June 2004, the unit supported the 1st (U.S.) Infantry Division in the area of Balad city in Iraq.







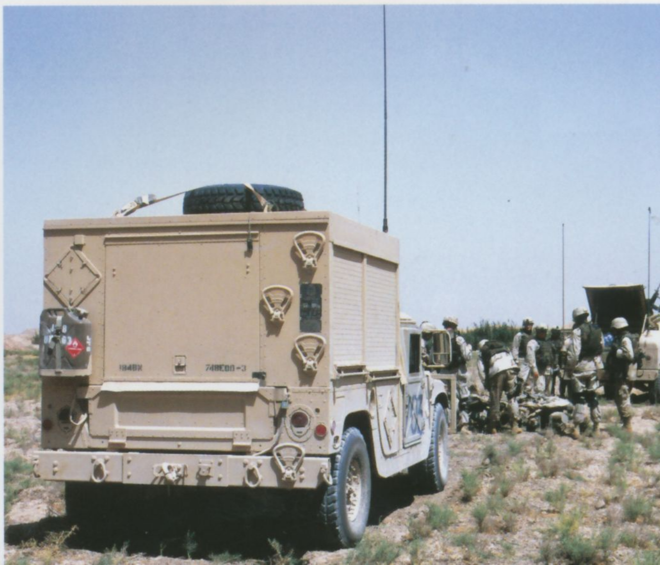
TRANSPORTATION DATA
BODY, EXPLOSIVE ORDNANCE DISPOSAL,
TRUCK MOUNTED, (M1097A2 HMMWV)

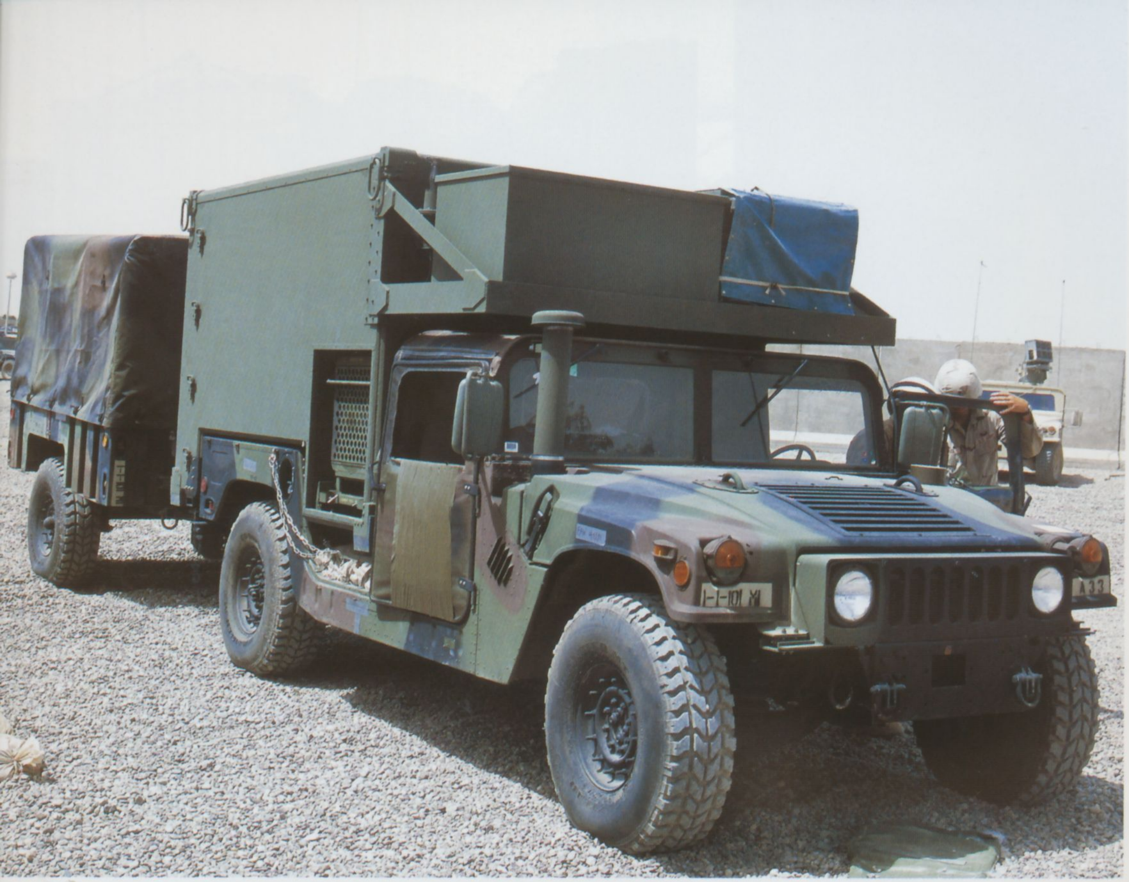
CH47D DUAL HOOK
SL
SL
98.5"
33"
38"
86
71"
130"
190.5"

	CURB	GAWR	GVW
FRONT AXLE WT	3350	3650	
REAR AXLE WT	4090	6850	
TOTAL WT	7440		10300

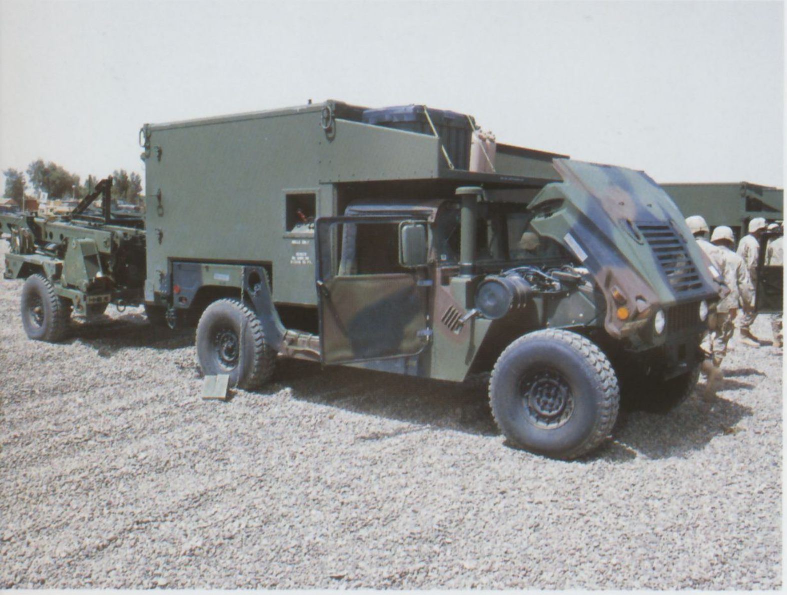
TIE DOWNS, USE M1097 PROVISIONS
⊕ CENTER OF GRAVITY

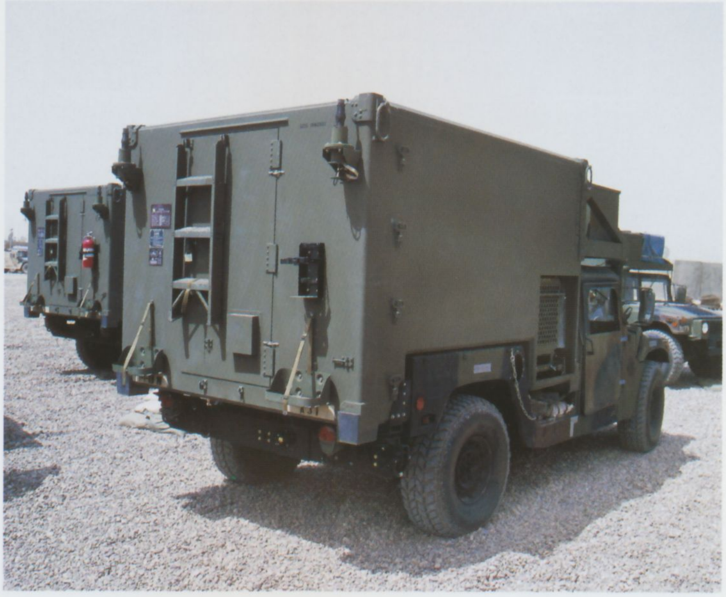
U.S. ARMY
BODY, EXPLOSIVE ORDNANCE DISPOSAL
TRUCK MOUNTED (M1097A2 HMMWV)
MODEL EODH NSN 4940-01-466-5337
SER. 198213 CAPACITY 10300 LB
SSN F027 GVW 10300 LB LENGTH 190.5 IN
CONT. # DATE MFD 06/2003 W 86 IN
LIN. # Z43073 SHIP WT 7440 LB HGT 99.5 IN
WARRANTY MO OR MI CUBE 950 FT
DATE SHIP DATE INSP 06/2003 INSP STAMP
MFD BY ROCK ISLAND ARSENAL IP/VF

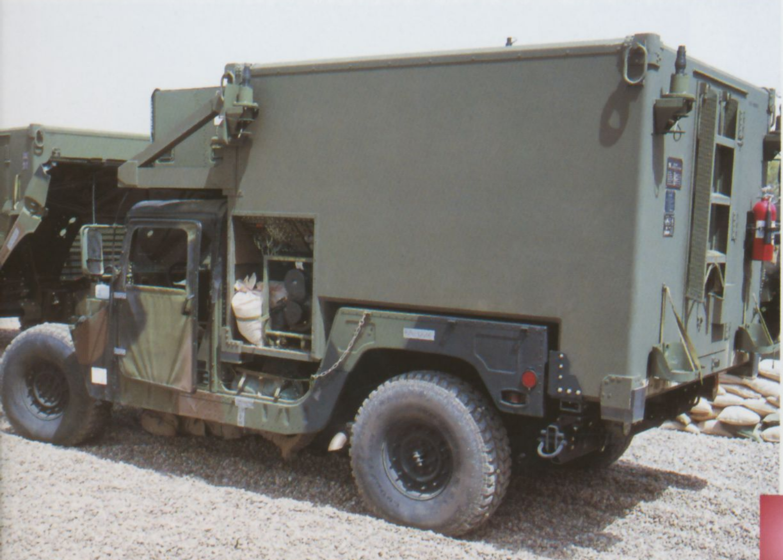


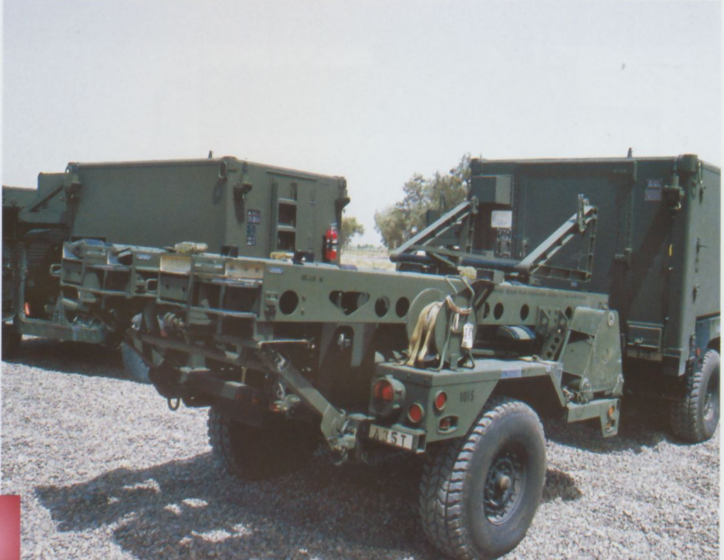


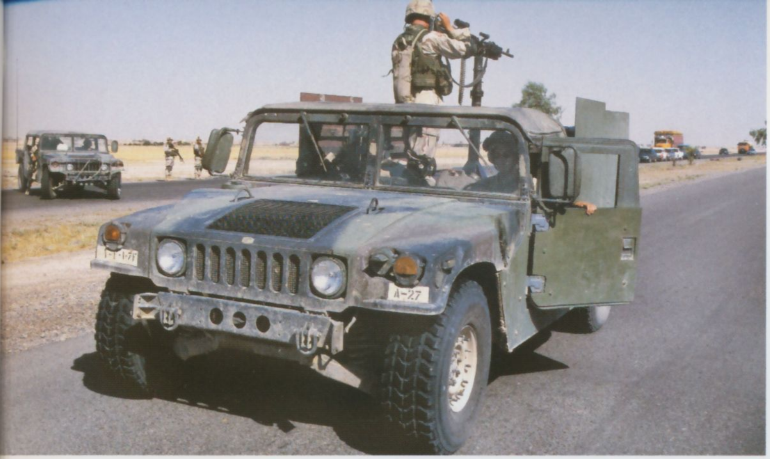
Originally designed as a platform for the M1114 Up-armored HMMWV, the M1113 HMMWV Expanded Capacity Vehicle has a much bigger payload than the standard HMMWVs, but still retains the HMMWV's outstanding mobility. Here the M1113 HMMWV Expanded Capacity Vehicle can be seen in use as a shelter carrier in service of the 101st Military Intelligence Battalion. The M1113 HMMWV has a gross vehicle weight of 11,500 lbs. and features strengthened suspension, drive train, and braking systems. As a result, the vehicle's maximum payload is increased to 5,150 lbs. Here the M1113 HMMWV Expanded Capacity Vehicle can be seen fitted with a shelter containing the control equipment for an UAV. In two pictures a trailer with the launch ramp of the UAV can be seen. Note that in some pictures soldiers can be seen laying sandbags on the HMMWV's floor boards. This is done in order to protect the crew against the effect of splinters from IEDs and mines, as the M1113 Expanded Capacity Vehicle has no armor protection at all.



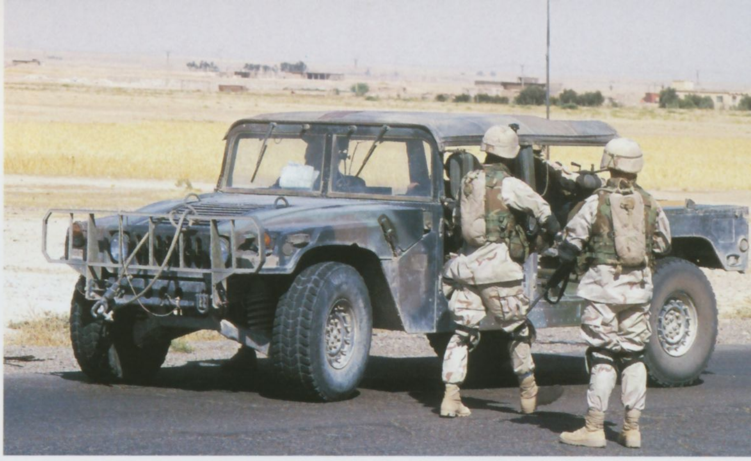




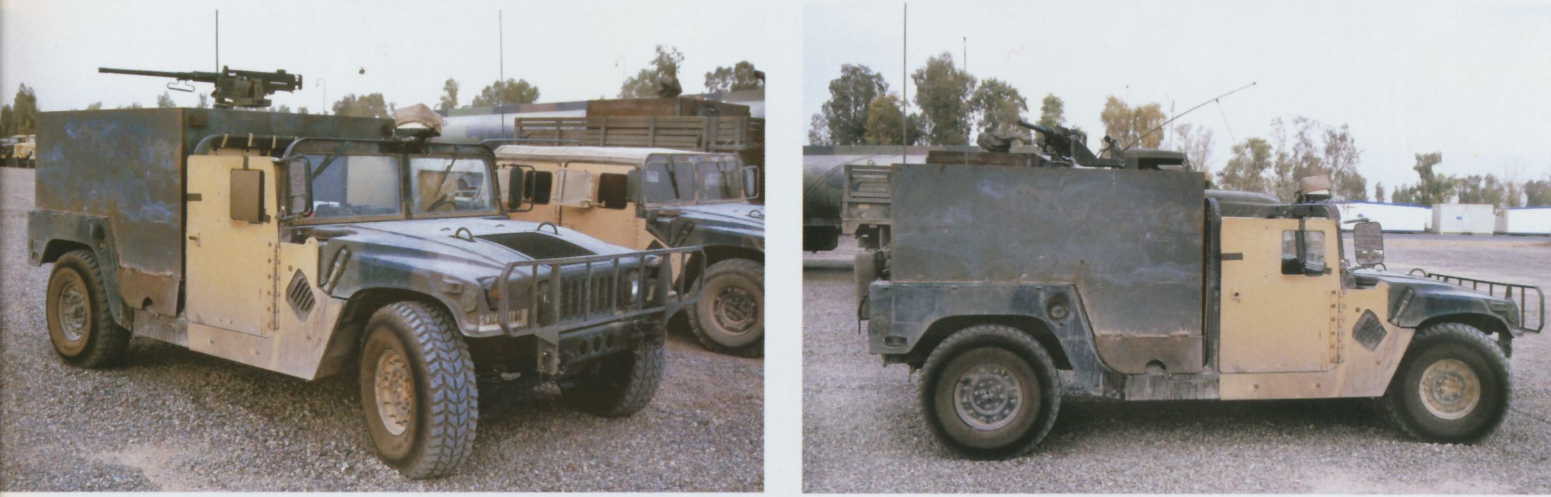




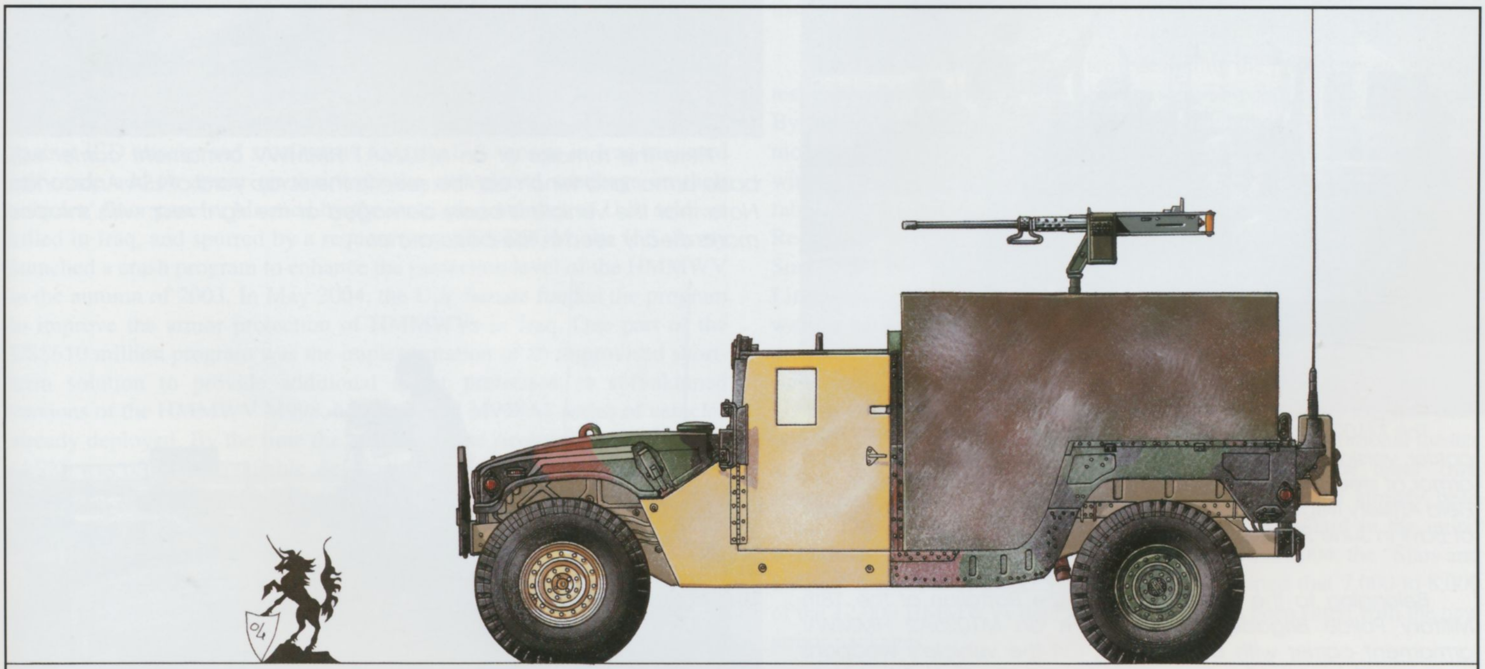
Here two HMMWVs of the 1st Battalion, 7th Field Artillery Regiment can be seen in position at a mobile vehicle checkpoint north of Bayji in June 2004. The vehicle in the front is an M998 HMMWV cargo and troop carrier with a two-door soft-top, while the vehicle behind it is also an M998 HMMWV cargo and troop carrier, but as a four-door soft-top version. Note the additional armor made at the unit level on the vehicle in front.



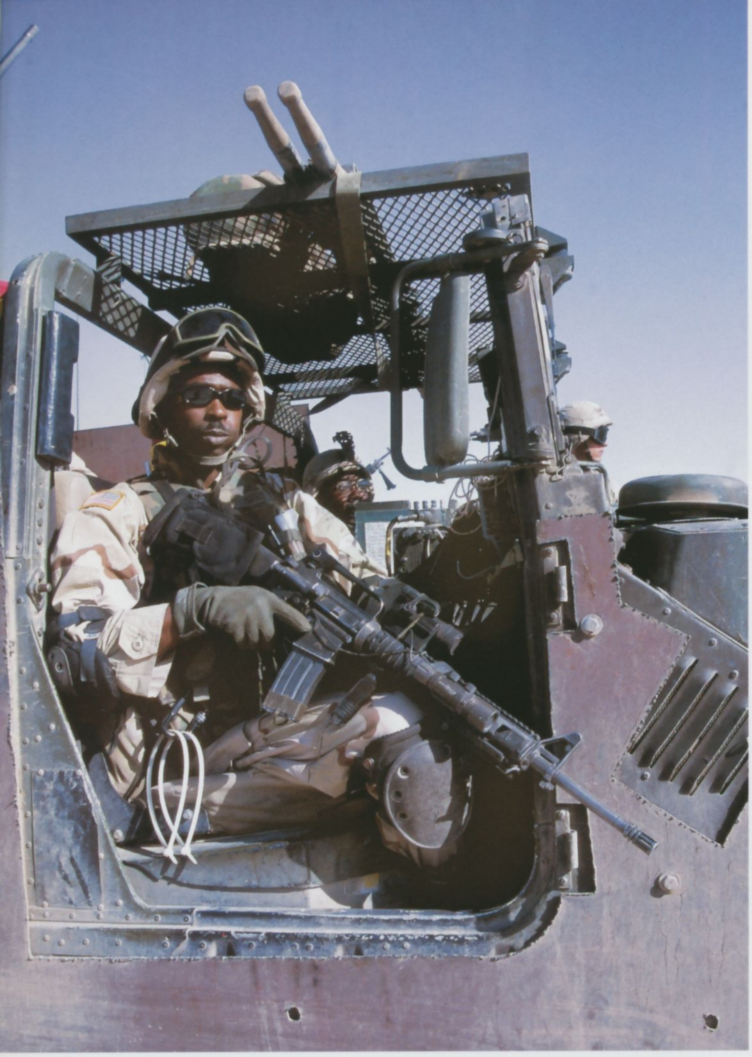
This M998 HMMWV two-door soft-top cargo and troop carrier, which has had its roof partly removed, was seen at a vehicle checkpoint on Main Supply Route (MSR) "Tampa" north of Bayji in June 2004. The vehicle belongs to Task Force 1-7 of the 1st (U.S.) Infantry Division. Note that the vehicle is fitted with basic armor doors instead of canvas doors, and that additional steel plates are mounted on the doors in order to increase the protection level.



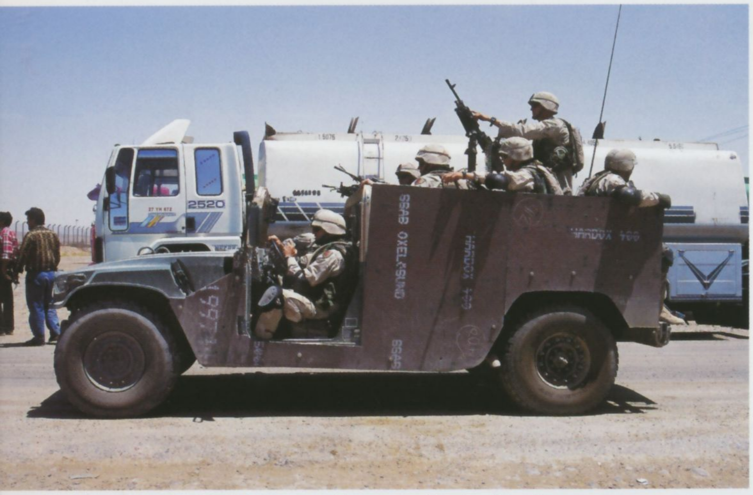
This M998 HMMWV cargo and troop carrier in the two-door version has been converted into a gun truck at unit level. Inside the fortress-type steel box in the vehicle's cargo bay, a .50-cal M2A2 HB heavy machine gun is mounted. In addition the vehicle is fitted with side panels and doors which, though similar to the Armor Survivability Kit, have notable differences. This vehicle belonged to one of the countless transport units based at LSA Anaconda in June 2004.



This is an M998 HMMWV cargo and troop carrier in the two-door version, which has been converted into a gun truck at unit level. Inside the fortress-type steel box in the vehicle's cargo bay, a .50-cal M2A2 HB heavy machine gun is mounted. Further to this, the vehicle is fitted with side panels and doors which at first glance are similar to the Armor Survivability Kit, but which in fact have significant differences.

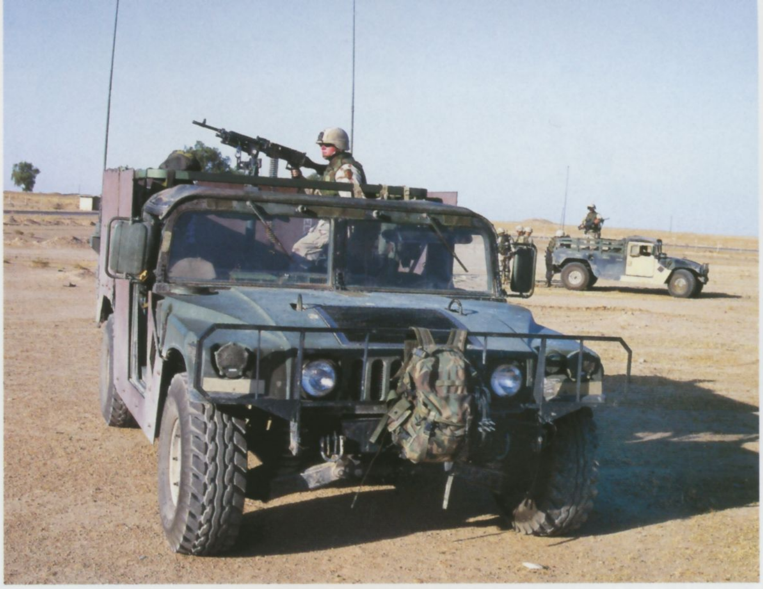


A soldier from Task Force 1-7 of the 1st (U.S.) Infantry Division can here be seen on patrol in the area around Bayji. Note that the HMMWV he is riding in has been fitted with unit level add-on armor made of normal steel plates, a common practice which has only a limited effect against IEDs or RPGs.

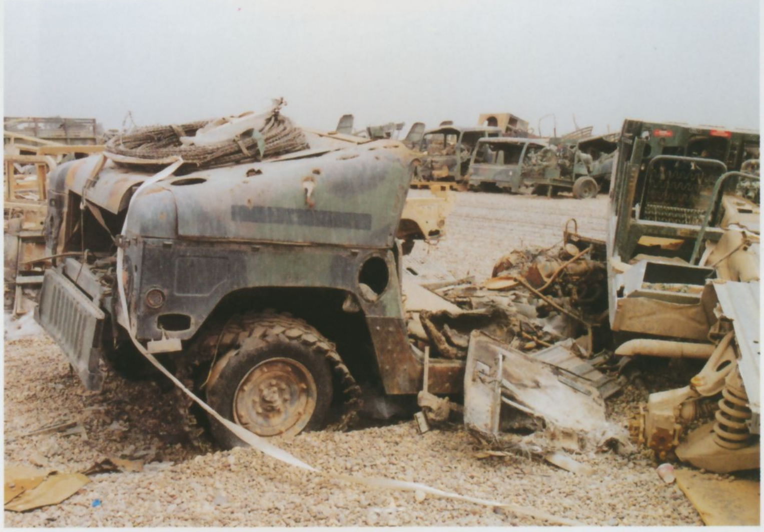


This M1097A2 Heavy Hummer Variant in the cargo and troop carrier version has been fitted with a workshop made add-on armor of steel plates. The vehicle belongs to the 1st Battalion, 7th Field Artillery Regiment, and was seen during a patrol in the vicinity of Bayji in June 2004.

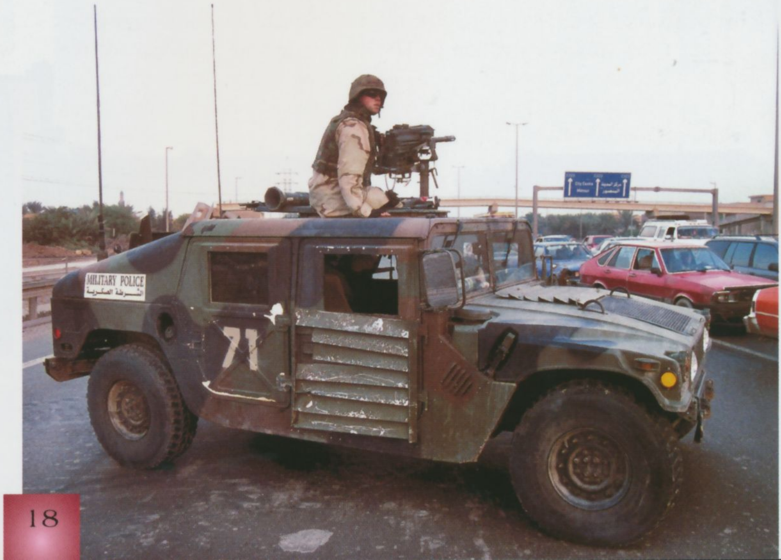
Belonging to the 793rd Military Police Battalion of the 18th Military Police Brigade, this vehicle is an M1025A2 HMMWV armament carrier with basic armor. On the vehicle's weapons mount, a 40mm Mk.19 automatic grenade launcher is fitted. Note the IFF panels and the military police markings in the Arabic language. The vehicle was seen on the outskirts of Baghdad on the highway linking Baghdad with Fallujah in November 2003.



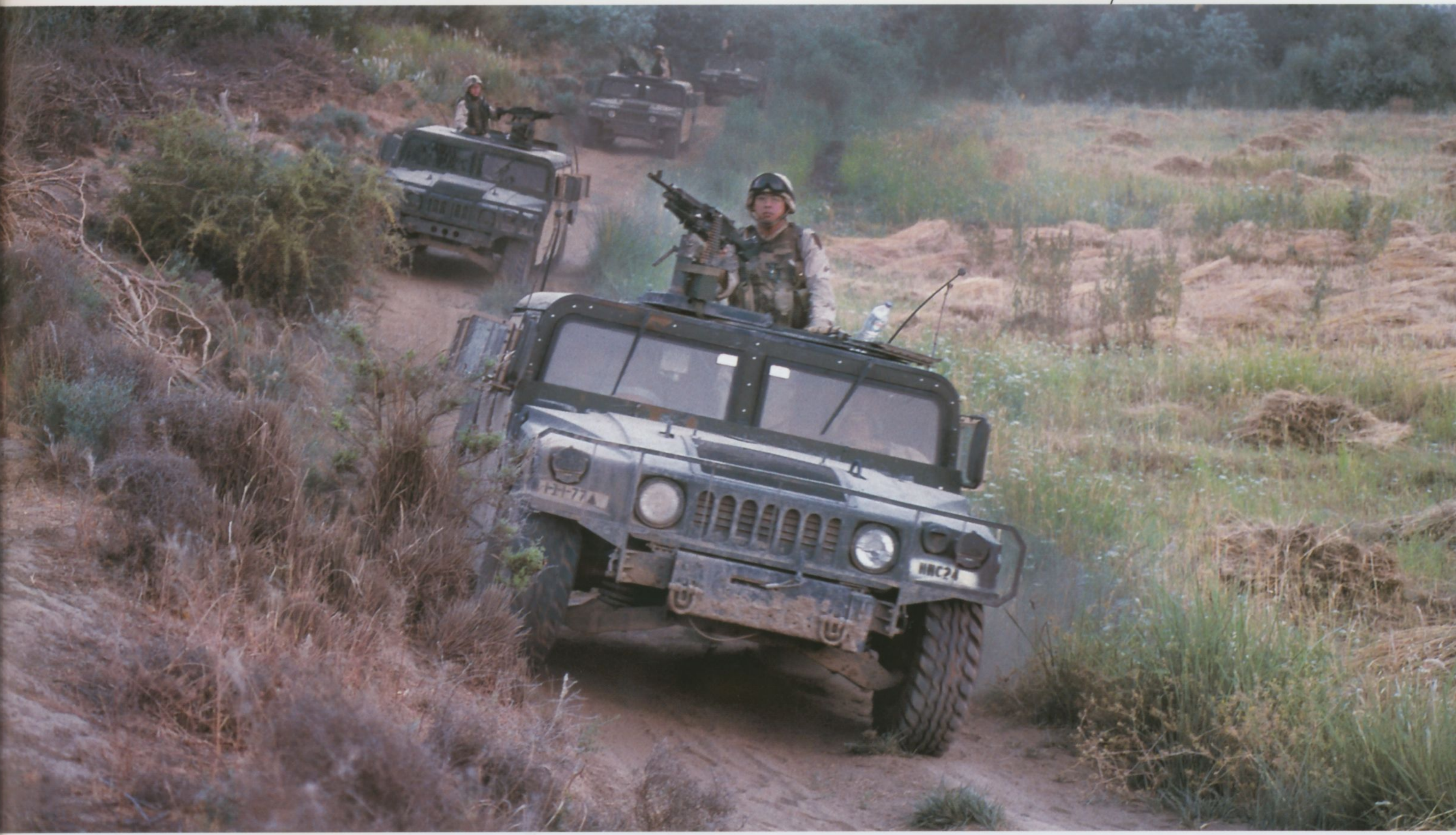
This M998 HMMWV cargo and troop carrier with a two-door soft top enclosure, belongs to A Company, 9th Engineer Battalion, which is part of TF 1-7, also nicknamed "Lightning". The vehicle was pictured during a patrol of the unit east of Bayji in June 2004. One of the patrol's tasks was the destruction of UXO (Unexploded Ordnance) left over from the 2003 war. The HMMWV is one of the vehicles fitted by a local German contractor with a special rail assembly in its cargo bay which protects the machine gunner from falling off the back. In Iraq the vehicle was then fitted with a further add-on armor kit in order to protect the gunner from enemy small arms fire.



Here the remains of an M1026A1 HMMWV armament carrier with basic armor and winch can be seen in the scrap yard of LSA Anaconda. Note that the vehicle is badly damaged at the right rear, with shrapnel marks clearly seen in the basic armor.



HMMWVs with Armor Survivability Kit



In the early morning of a day in May 2004, a patrol of the Scout Platoon of the 1st Battalion, 77th Armor Regiment is driving along the Tigris River valley. The first vehicle of the patrol is an M1026 HMMWV armament carrier with basic armor and winch, armed with a 7.62mm M240B machine gun. The vehicle is fitted with the four-door kit of the ASK.

Most HMMWV variants used by the U.S. forces for transport and liaison duties do not offer any armor protection for their drivers and passengers. This state of affairs culminated in the loss of several lives when the conflict in Iraq turned from a conventional war into a guerrilla-type asymmetric conflict in which there was no longer a defined frontline. With the change to guerrilla war, not only the frontline combat troops became a target for the often invisible enemy, but it also became more and more common that U.S. support troops and their convoys were attacked or ambushed. In an initial attempt to increase the protection of their vehicles against IED attacks and small arms fire, the U.S. troops in Iraq mounted self-made add-on armor on their vehicles and placed sandbags on their vehicles' floor panels. Alarmed by the increasing number of U.S. soldiers killed in Iraq, and spurred by a request from CENTCOM, the U.S. Army launched a crash program to enhance the protection level of the HMMWV in the autumn of 2003. In May 2004, the U.S. Senate funded the program to improve the armor protection of HMMWVs in Iraq. One part of the US$610 million program was the implementation of an improvised short-term solution to provide additional armor protection to soft-skinned versions of the HMMWV M998, M998A1 and M998A2 series of vehicles already deployed. By the time the money for the Armor Survivability Kit (ASK) was officially available, development of the ASK had already been completed and production of the ASK was running at high speed.

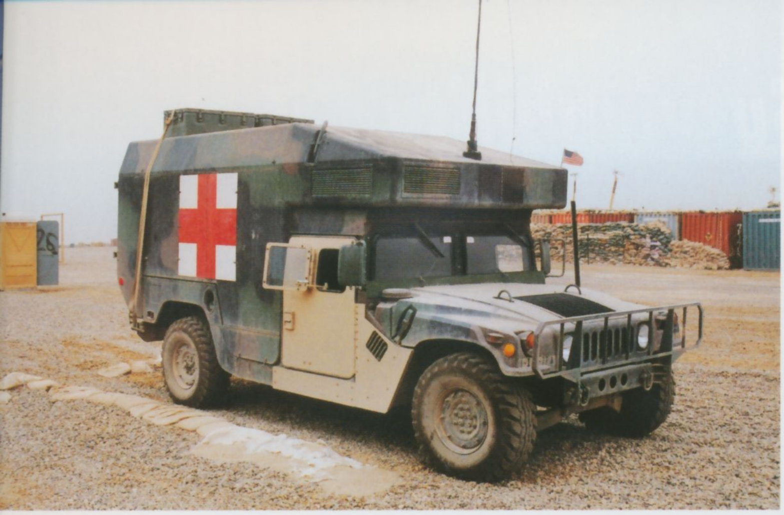
Development of the Armor Survivability Kit (ASK)

Development of the Armor Survivability Kit started at the Research Development and Engineering Command's (RDECOM) Tank Automotive Research, Development and Engineering Center (TARDEC), and the Army Research Laboratory (ARL), back in October 2003. In only 20 days, designers and engineers designed, produced and tested the new door kit and the new protection panels. In this process computer controlled lasers, vertical mills and water cutting systems were used to produce the prototype sets. The prototype sets were mounted on different HMMWV variants and underwent a 1,650 mile test drive, as well as extensive ballistic testing. During ballistic testing of the Armor Survivability Kit, IEDs made of 155mm artillery shells, as well as other ordnance, were used.

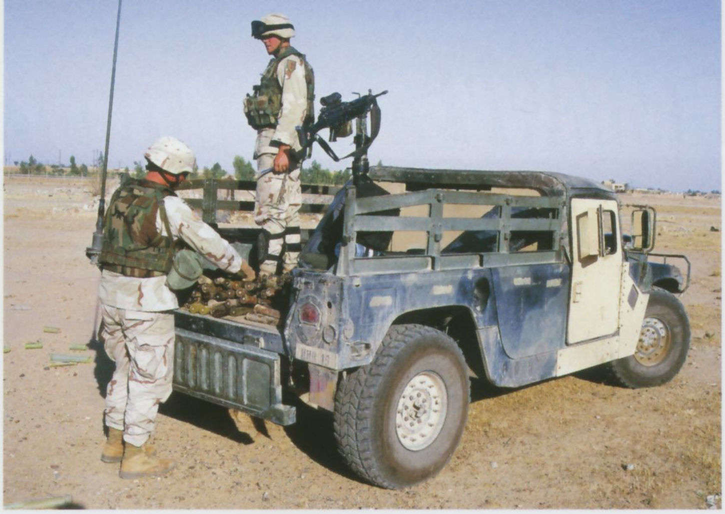
On 13th November 2003, after redesigning the prototypes in line with test experiences, the first 15 ASK sets were shipped to Iraq and Kuwait. By the end of November 2003, 100 kits were already in use. Within two months of development starting, the first vehicles in Iraq were equipped with the new add-on armor package. By early 2004, the government fabrication facilities at Anniston Army Depot, Rock Island Arsenal and Red River Army Depot had already started mass production of the Armor Survivability Kit. Later, three other government fabrication facilities, Lima Army Tank Plant, Sierra Army Depot and Anniston Army Depot, were also tasked with producing ASK sets, in an effort to speed up production. One problem which occurred during initial production was the shortage of suitable armor steel, as it was not currently in production in U.S. steel factories. However, by March 2004, some 2,261 kits had been produced. The completed kits were then shipped to the operational theater where they were fitted to vehicles at unit level by the units' own maintenance personnel. By the end of March, 1,636 had already been fitted. The ASK can be fitted with tools that are standard in the units' workshops, since no special tools are needed. In June 2004, the "Stars and Stripes" magazine of the U.S. Armed Forces reported that 7,000 to 8,000 of the 12,000 HMMWVs deployed in-theater had been fitted with the new armor packages.

The Armor Survivability Kit

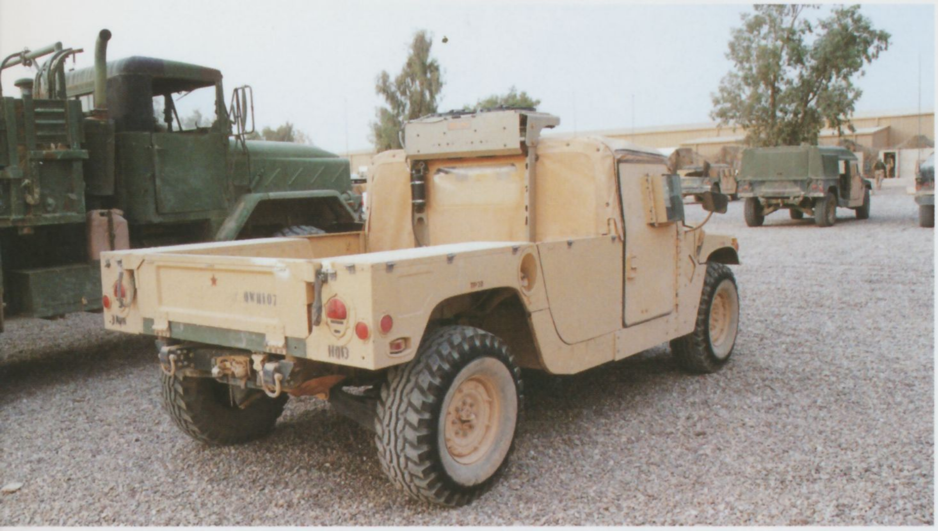
The ASK is available in two versions, one designed to match the two-door variants of the HMMWV family, while the other matches the four-



All existing HMMWV variants can be fitted with the Armor Survivability Kit, and here the two-door kit is fitted to an M997 Maxi-Ambulance. Inside the vehicle there is space for four patients on stretchers, or eight ambulatory patients. The vehicle belongs to the 1st Battalion, 77th Armor Regiment ("Steel Tigers"). The ASK adds some 900 pounds of extra weight to the M997 ambulance.

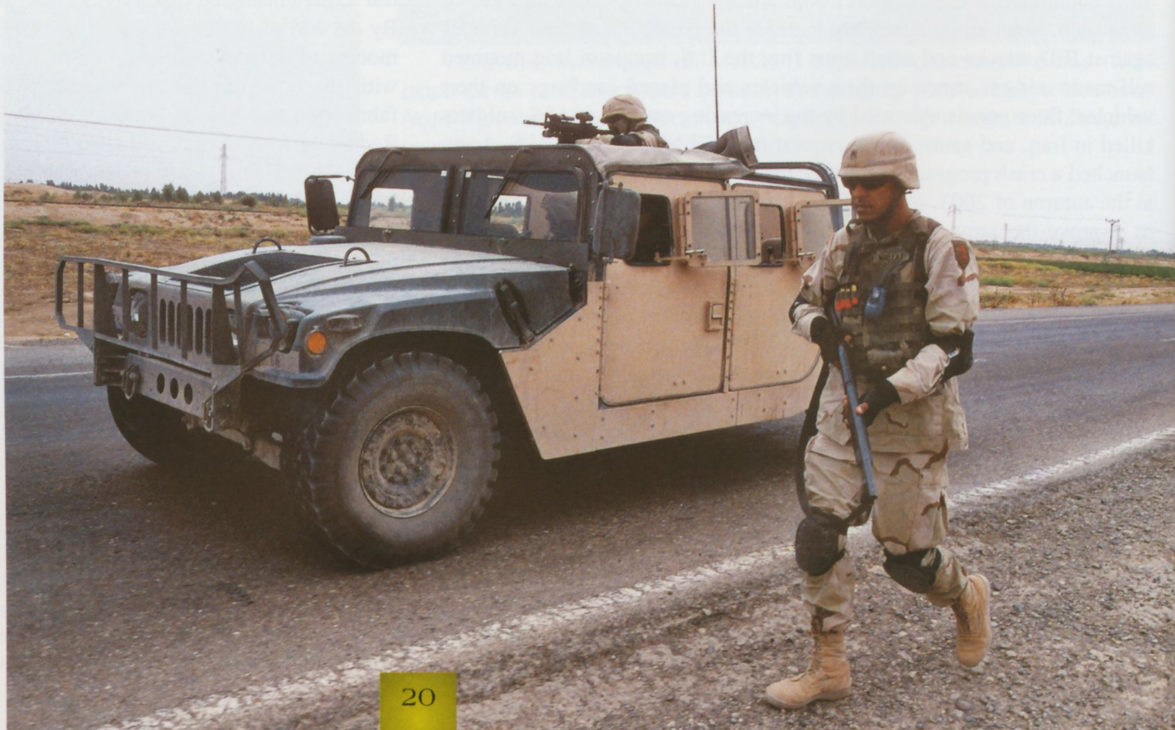


Soldiers from the 9th Engineer Battalion of the 1st (U.S.) Infantry Division load unexploded ammunition onto an M998 HMMWV cargo and troop carrier in a pickup configuration. Only the original soft-top crew cab has been left fitted to the vehicle. This vehicle is fitted with the Armor Survivability Kit, of which the armored seatback is recognizable in the cab.

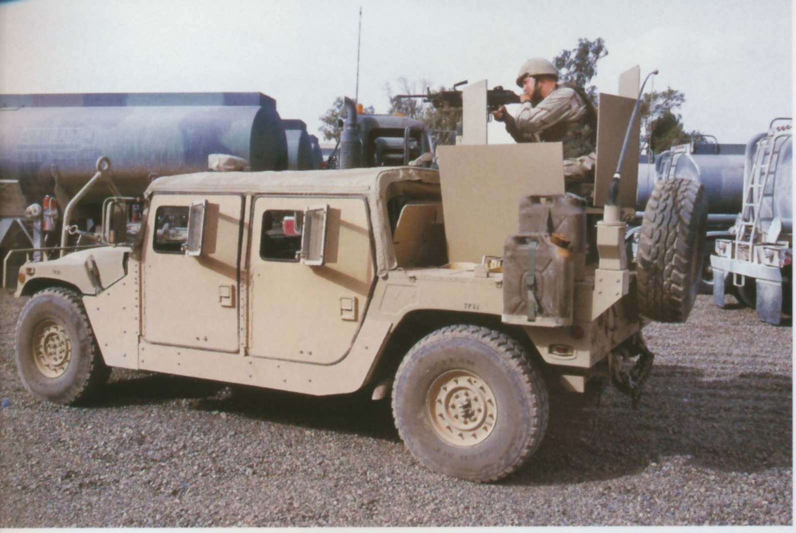


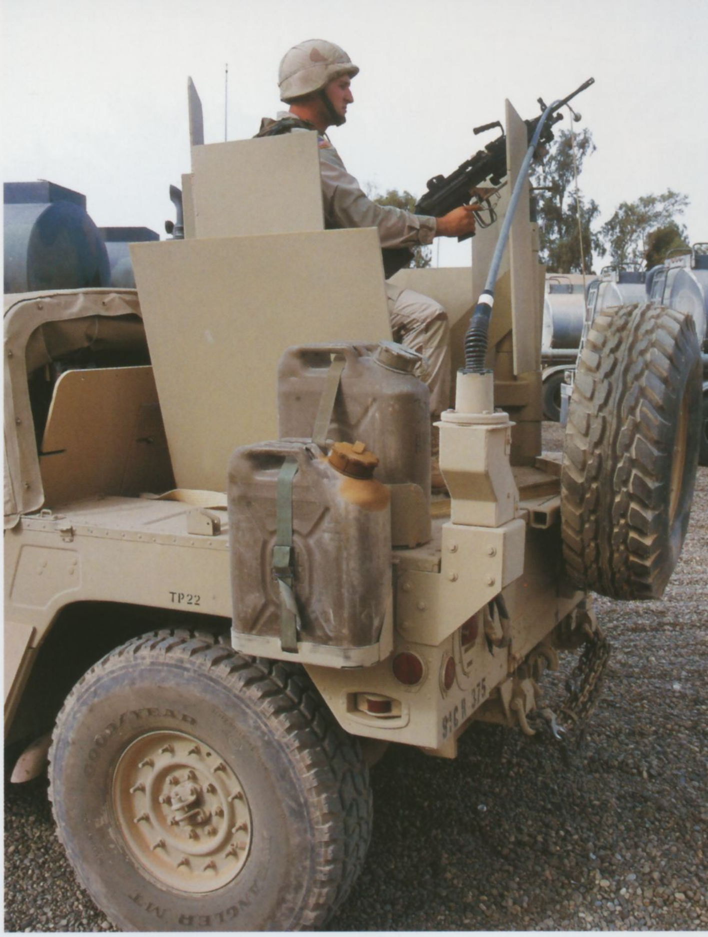
This M998 HMMWV cargo and troop carrier with soft-top and two-door enclosure belongs to the 3rd Aviation Battalion. The vehicle was seen at LSA Anaconda in June 2004, and is fitted with the ASK. Remarkable is the fact that the vehicle is fitted with an air-conditioning system, which can be seen here mounted on a frame over the crew cab.

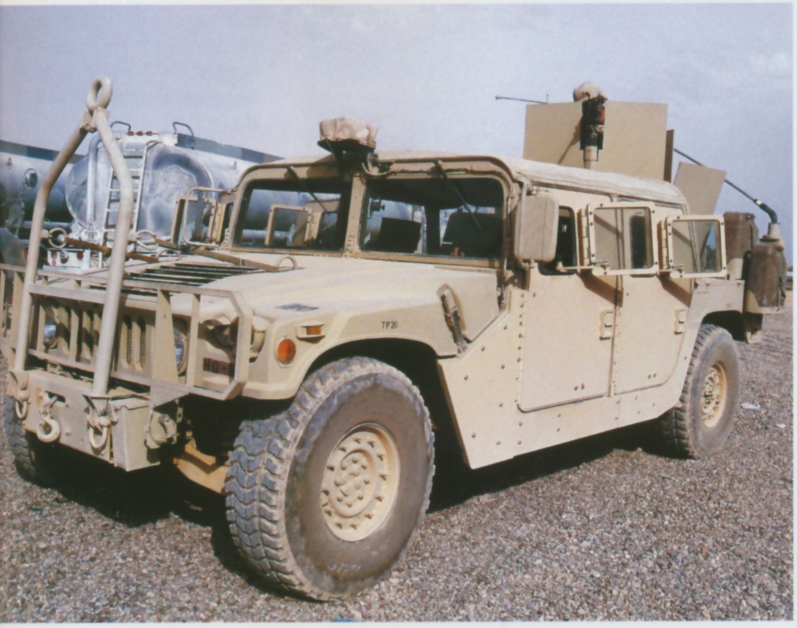
door variants. The two-door kit weights 900 pounds, while the four-door kit weights 1,300 pounds. The kits include armored doors which are fitted as straight replacements for standard canvas or fiberglass doors. In the doors, small ballistic-resistant windows are situated, which allow the crew to fire their weapons while still staying inside the vehicle. The windows can be opened and closed by a handle. A simple sliding mechanism is used to swing the windows open or closed. The windows slide in a semi-circular motion towards the rear. It is possible to secure the window at different angles when it is open. The doors are fitted with weather-resistant strips which help keep out the environment. The ASK also includes armored seatbacks, reinforced floor panels, windshields made of bulletproof glass, heavy-duty latches to withstand the weight of the armored doors, and rocker protection panels. While several materials like aluminum, composites and so on were tested, the final production ASK kits are made from high quality steel which is similar to that used to manufacture modern tanks.



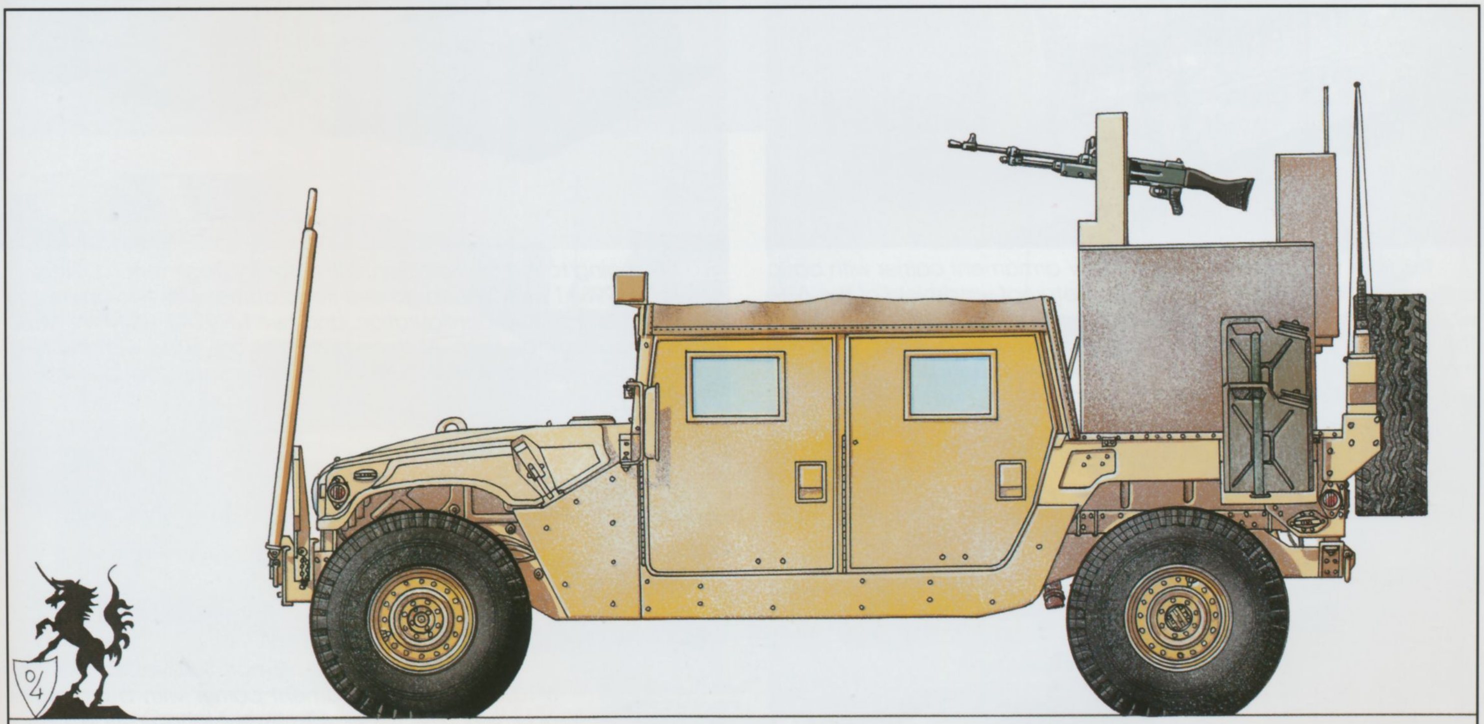
Fitted with the four-door Armor Survivability Kit, this M998 HMMWV cargo and troop carrier with soft-top was seen on patrol south of Balad in May 2004. The vehicle belongs to Task Force 1-77 of the 1st (U.S.) Infantry Division. Easily visible is the windshield of bulletproof glass which has a green frame, while the doors are painted a sand color.



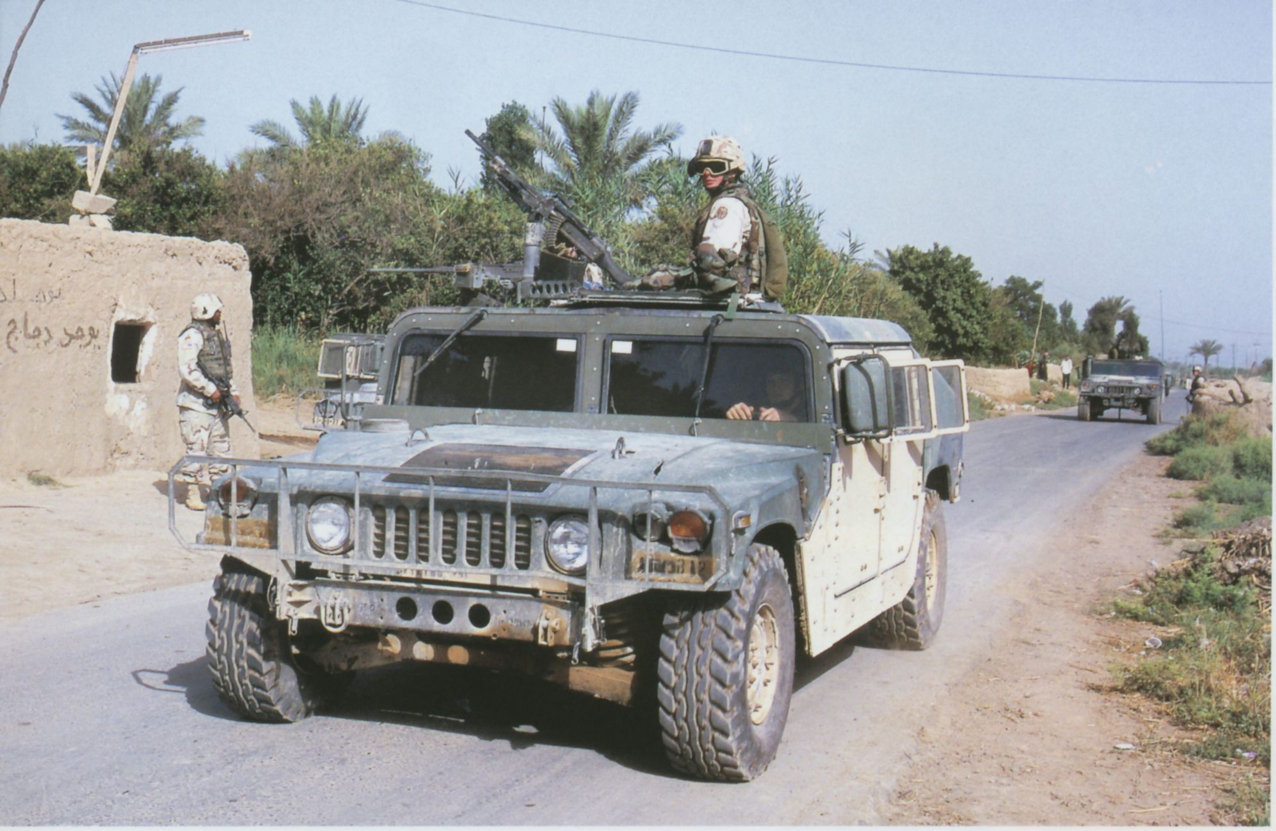




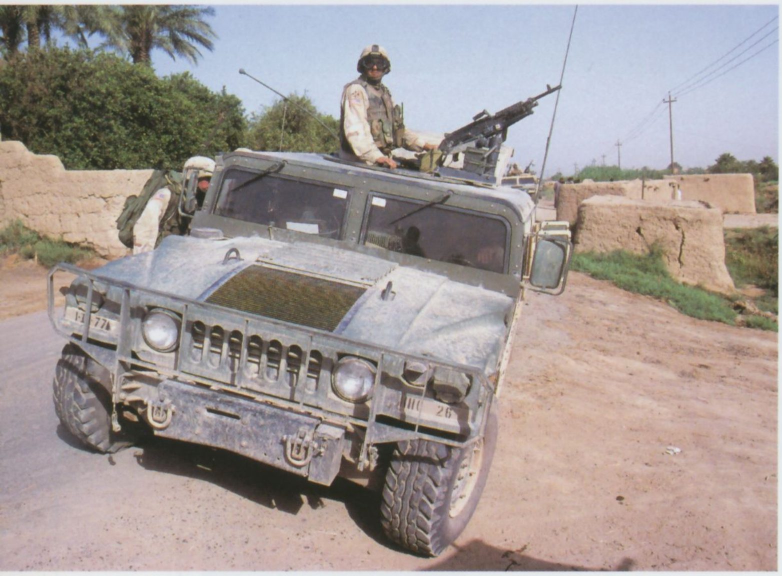
In addition to the Armor Survivability Kit, this M1038 cargo and troop carrier with winch is fitted with a special machine gun mount in its cargo bay. The gun mount, on which there is a 5.56mm M249 SAW, can be rotated 360°. The gunner is protected by a gun shield and armored plates around his seat. Additional protection is provided by an assembly of armored plates which protect the lower part of the gunner's body. The vehicle was seen at Camp Anaconda and was used by the unit to which it belonged for convoy escort duties.



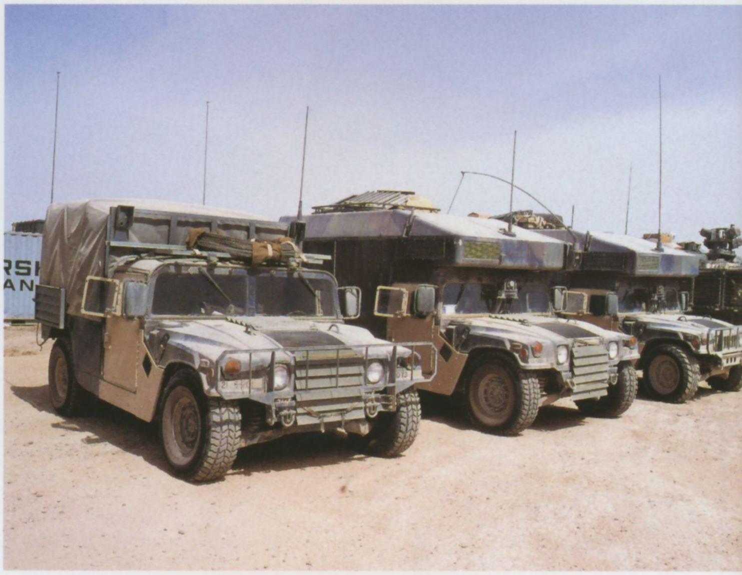
Belonging to a transportation unit, this M1038 MMMWV cargo and troop carrier with winch has been converted into a gun truck. In addition to the Armor Survivability Kit, it is fitted with a special machine gun mount in its cargo bay. The gunner is protected by a gun shield and armored plates are also protecting his seat. Additional protection is provided by an assembly of armored plates which protect the lower part of the gunner's body. The vehicle is used by the unit for convoy escort duties.



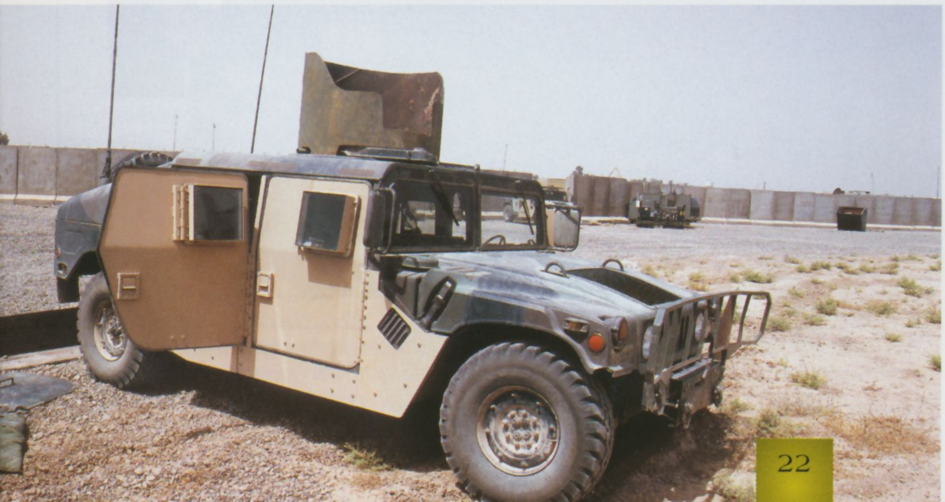
The policing type of mission in Iraq calls for U.S. forces to show a high degree of presence on the streets. This makes them vulnerable to small arms fire and ambushes. In order to give the GI in his soft-skinned HMMWV some degree of protection, most of the HMMWVs deployed to Iraq were fitted with the Armor Survivability Kit by mid-June 2004. This M1025 armament carrier with basic armor belongs to Task Force 1-77 and was seen on patrol east of Balad. The vehicle's weapon station is fitted with a 7.62mm M240B machine gun.



This front view of an M1026 HMMWV armament carrier with basic armor and winch well illustrates the bulletproof windshield of the ASK, which consists of bulletproof glass and a frame of high quality steel. The weapon station of the vehicle is fitted with a 7.62mm M240B machine gun. The HMMWV belongs to the 1st Battalion, 77th Armor Regiment of the 1st (U.S.) Infantry Division.

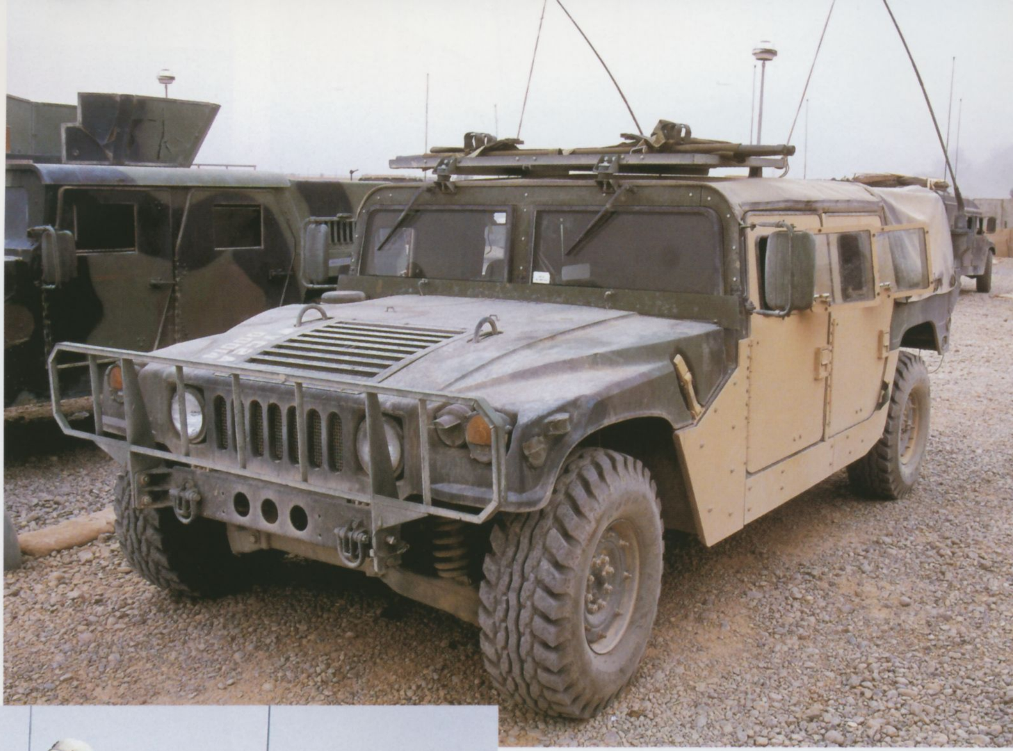


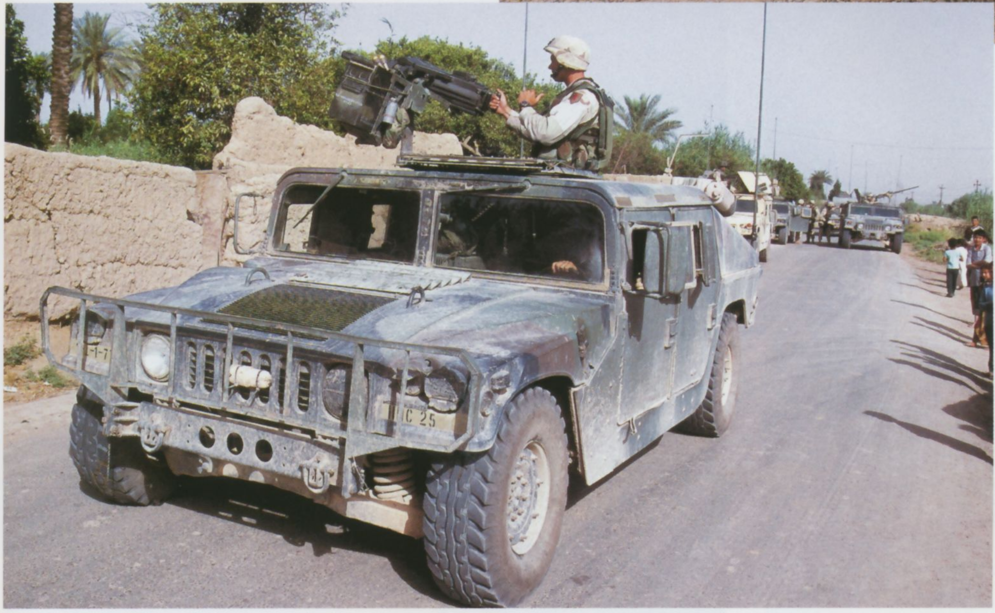
Belonging to the 5th Battalion, 20th Infantry Regiment (a "Stryker" unit), an M998A1 HMMWV cargo and troop carrier with two doors and a soft-top in a pickup configuration, and two M997A1 HMMWV Maxi-Ambulances can be seen. All three HMMWVs are fitted with the two-door version of the Armor Survivability Kit minus the bulletproof windshield.



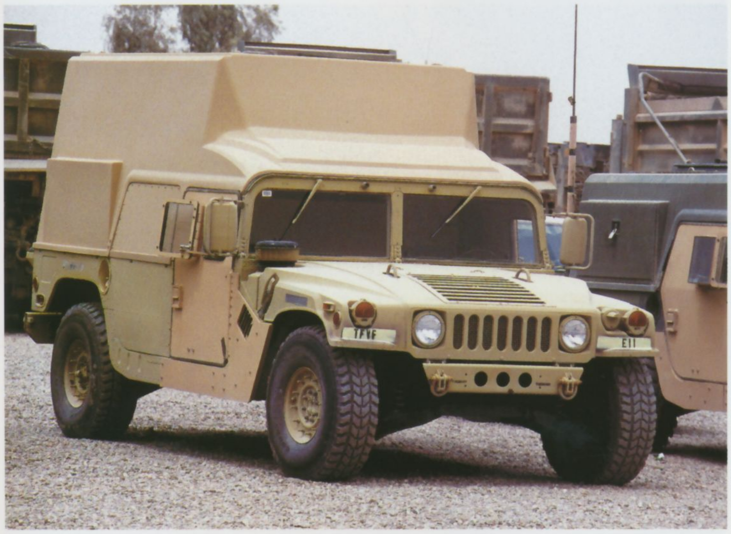
In addition to the Armor Survivability Kit, this M1026 HMMWV armament carrier with basic armor and winch is fitted with a workshop-made armor protection kit for the gunner. Mounted to the vehicle's weapon station, the makeshift armor is made from a piece of large diameter pipe usually used for building oil pipelines. The piece of pipe is fitted to the vehicle's roof-mounted weapon station.

This picture shows an M998A1 HMMWV cargo and troop carrier, with a four-door soft-top, of Task Force 1-77. Easily visible are the armor plates of the ASK installed around the doors and lower body. While the vehicle's ASK armored doors are painted in a sand color, the armored frame of the bulletproof window is painted bronze green. Note the roof rack on which a stretcher is stored for casualty evacuation.

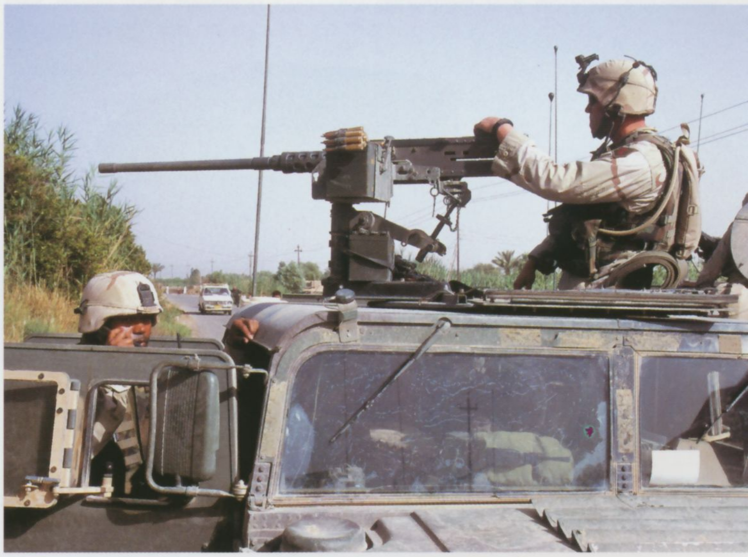




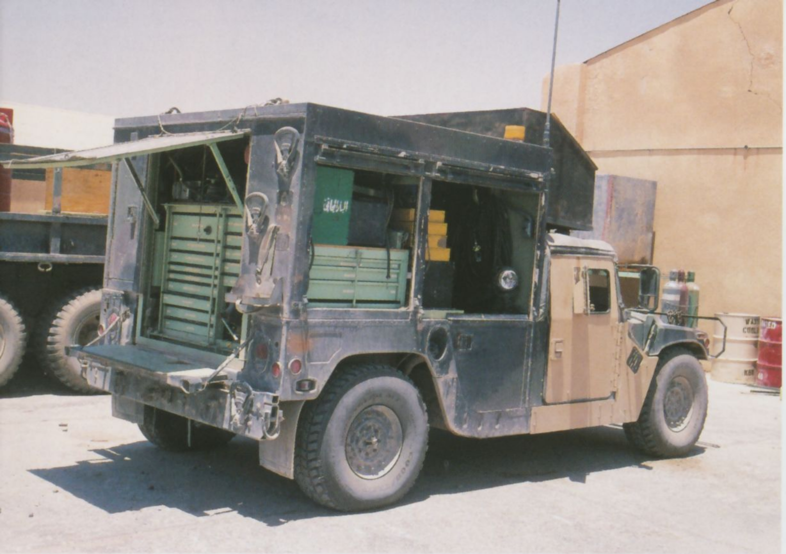
The weapon station of this M1026A1 HMMWV armament carrier with basic armor is fitted with a 40mm Mk.19 automatic grenade launcher. The vehicle was seen on patrol east of Balad in June 2004. It belongs to the 1st Battalion, 77th Armor Regiment of the 1st (U.S.) Infantry Division.



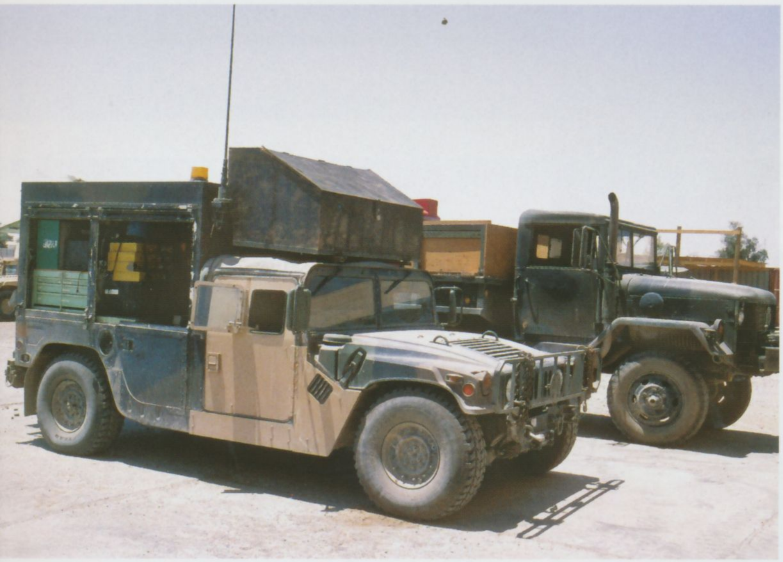
Seen at Camp Anaconda, this M998A1 HMMWV cargo and troop carrier is fitted with a fiberglass hardtop. The hardtop bears similarities with that originally developed for the Mobile Radio Communications (MRC) vehicle, but has a much higher raised roof. In addition the cargo storage door on the side of the MRC is missing on these new unidentified fiberglass hardtops.

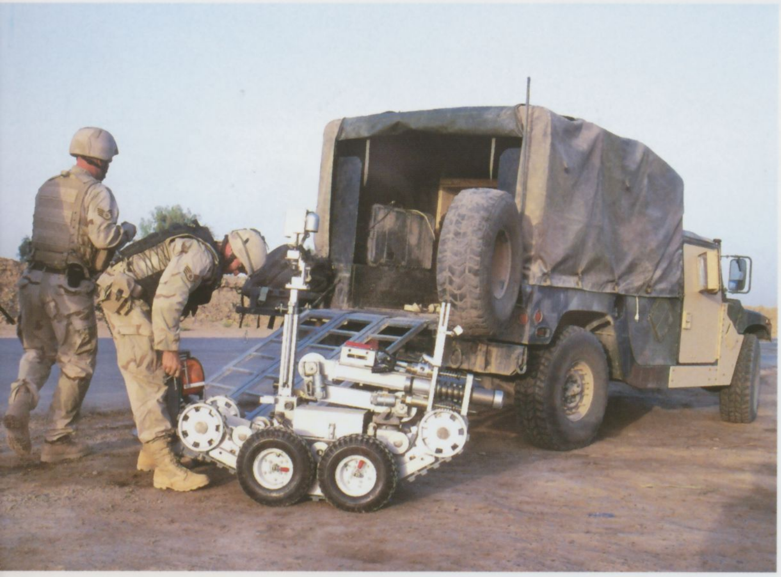


From the roof of an M1026A1 HMMWV armament carrier with basic armor, a machine gunner scans the surrounding terrain for trouble. The weapon station of the vehicle is fitted with a 12.7mm M2A2 HB heavy machine gun. The vehicle belongs to a unit of the 1st (U.S.) Infantry Division ("Big Red One").

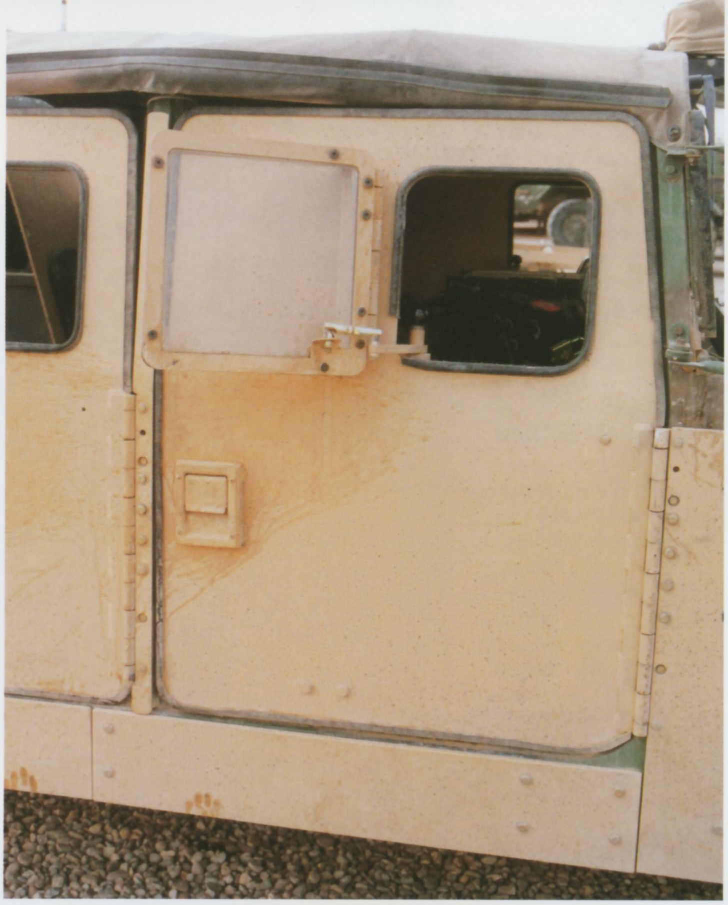


This M1042 HMMWV shelter carrier with winch has a maintenance shelter mounted over its cargo bay. The shelter holds a large variety of tools including a welding kit and various power operated tools. The shelter is made by the Rock Island Arsenal and is similar to the shelter used by Explosive Ordnance Disposal teams.

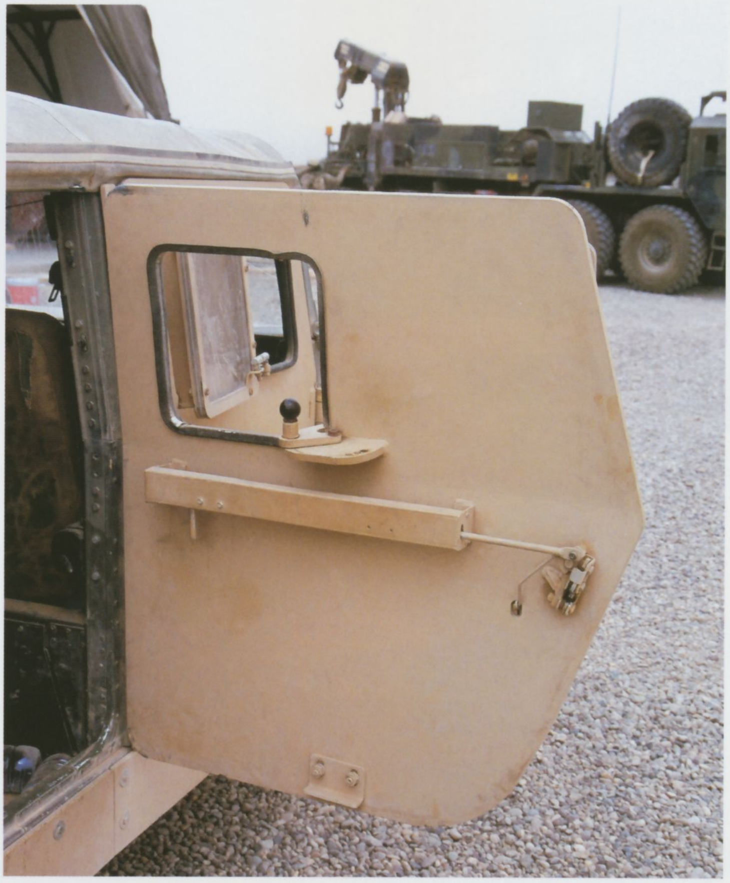




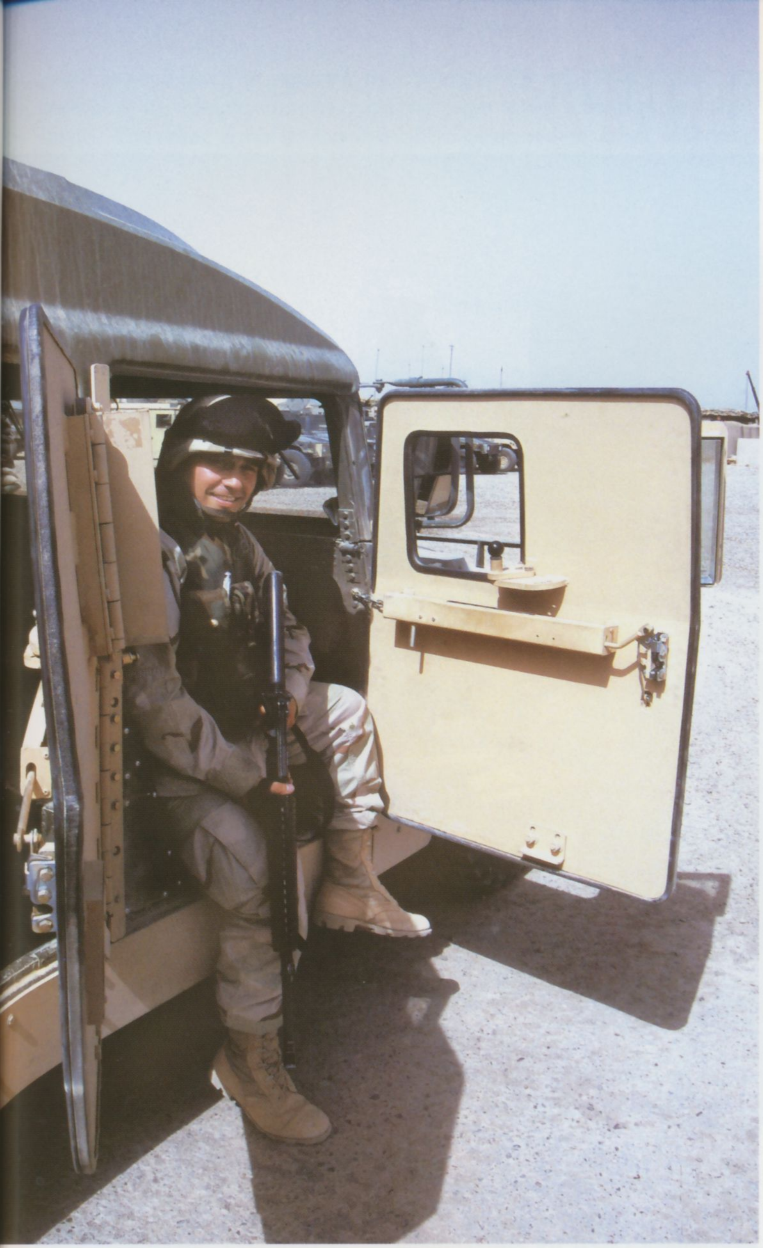
In order to deal with the large number of IEDs placed on Iraq's roads by local insurgents, the U.S. Army is supported by EOD teams of the U.S. Air Force. Here an M1038A1 HMMWV cargo and troop carrier (with soft-top in the pickup configuration) can be seen after the EOD team has just unloaded its EOD robot. The vehicle is fitted with the two-door version of the ASK.



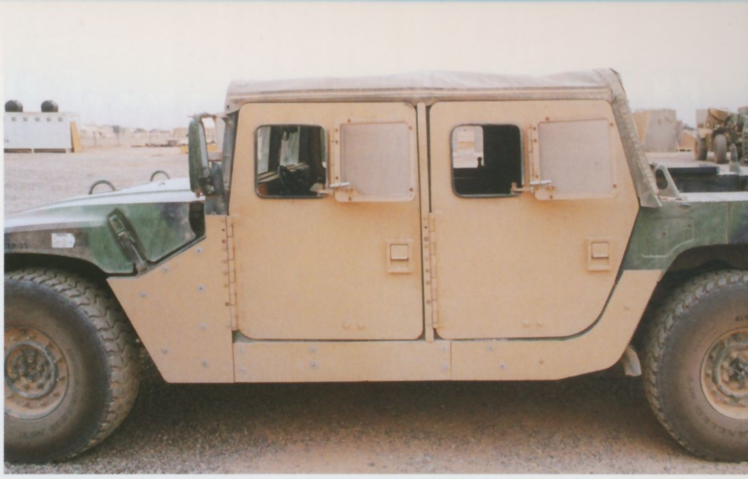
An exterior close-up of a rear door from a four-door Armor Survivability Kit. Note the open window which well illustrates the thickness of the glass in the small ballistic-resistant windows.



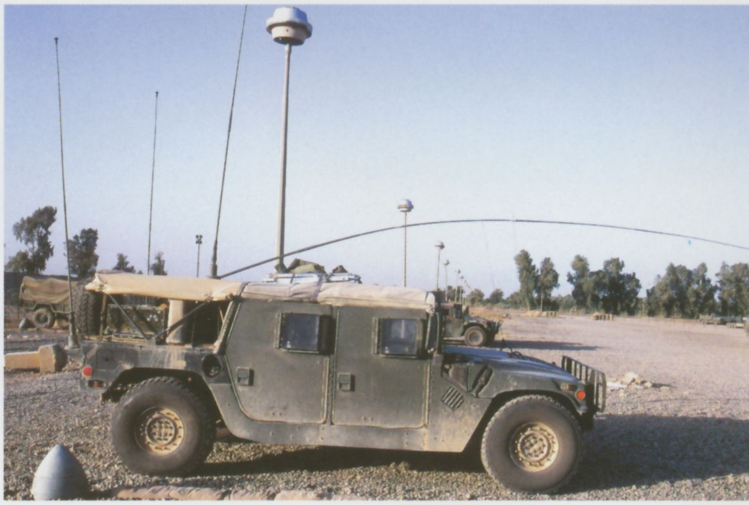
This interior detail picture of a rear door from a four-door Armor Survivability Kit portrays the simple door opening mechanism, as well as the window opening mechanism with its lever and adjustment plate. The window can be placed in different positions, and once in position, a pin locks the lever in a drilled hole in the semi-circular plate.



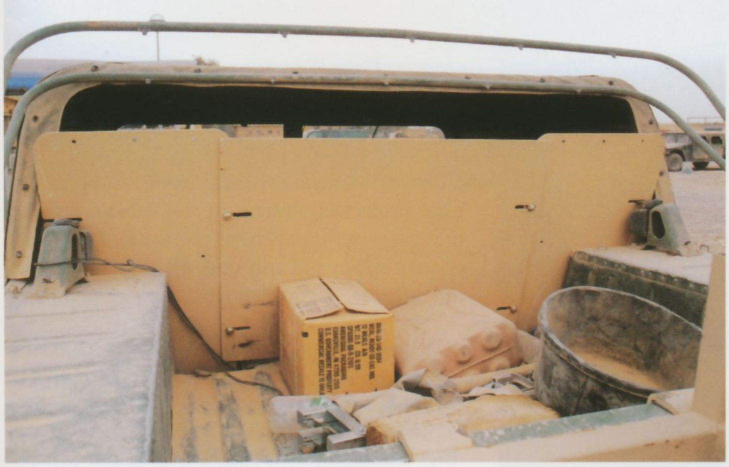
Interior detail of the front right door from a four-door Armor Survivability Kit.



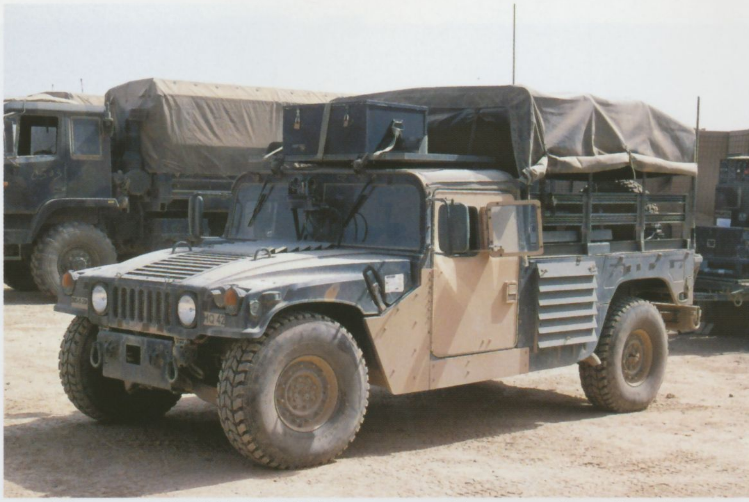
The doors of the Armor Survivability Kit are fitted with small ballistic-resistant windows. The windows allow the HMMWV crews to fire their weapons while staying in the vehicle. Note the opening mechanism; once the window is open a relatively high degree of force is needed to close the window again. The reason for this is the short lever which provides relatively low leverage. Also visible are the armored side plates running along the chassis. The plates are made of high quality steel.



This M1097A2 HMMWV cargo and troop carrier with four doors and soft-top belongs to the 1st Battalion, 77th Armor Regiment. The vehicle is fitted with the four-door version of the ASK, which adds 1,300 pounds to the vehicle's combat weight. However, due to the fact that the A2 series vehicles are fitted with a powerful General Motors 6.5 liter diesel fuel injection naturally aspirated V 8 engine, the extra weight hardly has an impact on the vehicle's performance.

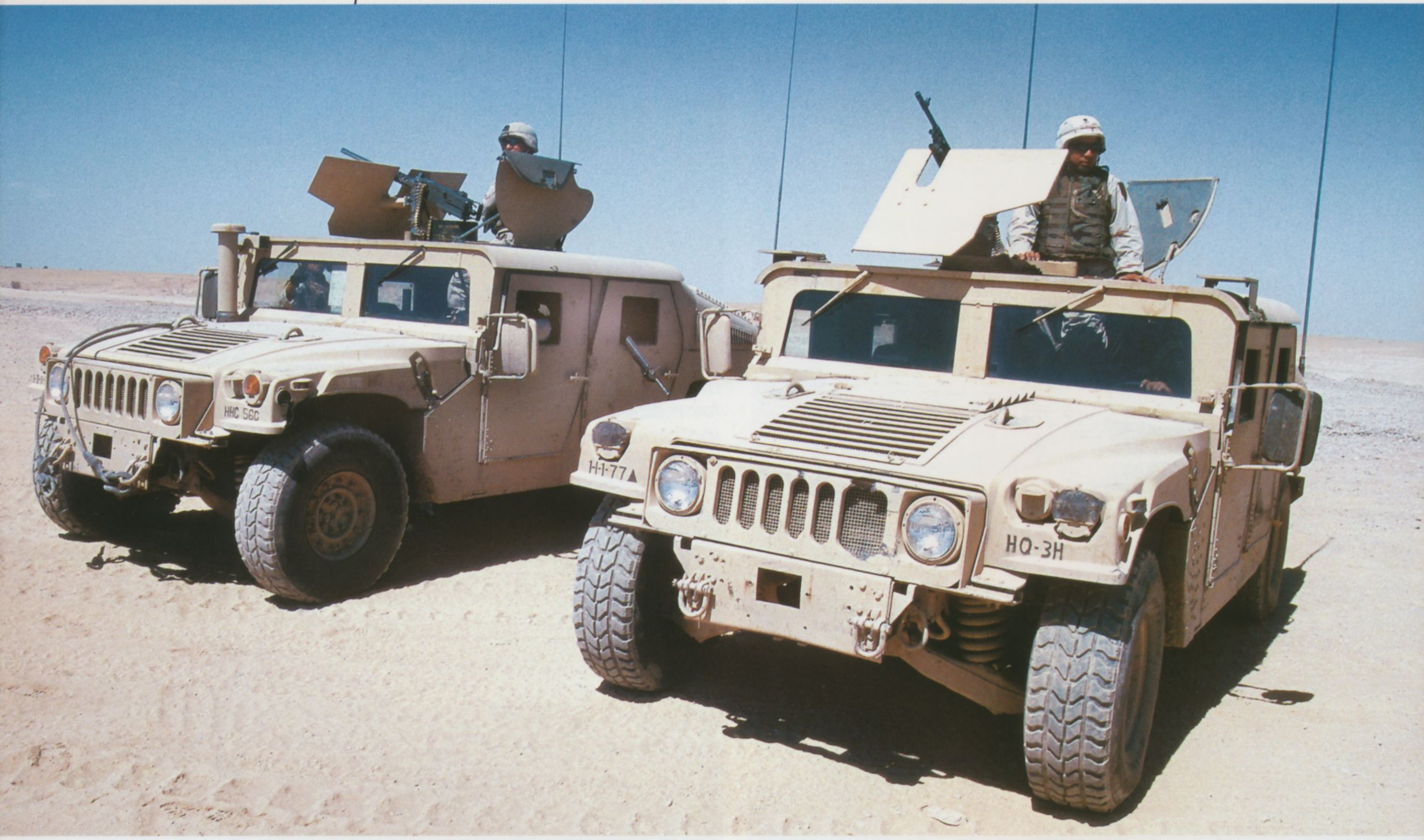


Here the Armor Survivability Kit is seen fitted to an M1097A2 HMMWV in the cargo and troop carrier version with soft-top and four doors. Note the armored seatbacks which can be seen sticking out from under the canvas enclosure at the rear of the cab compartment.



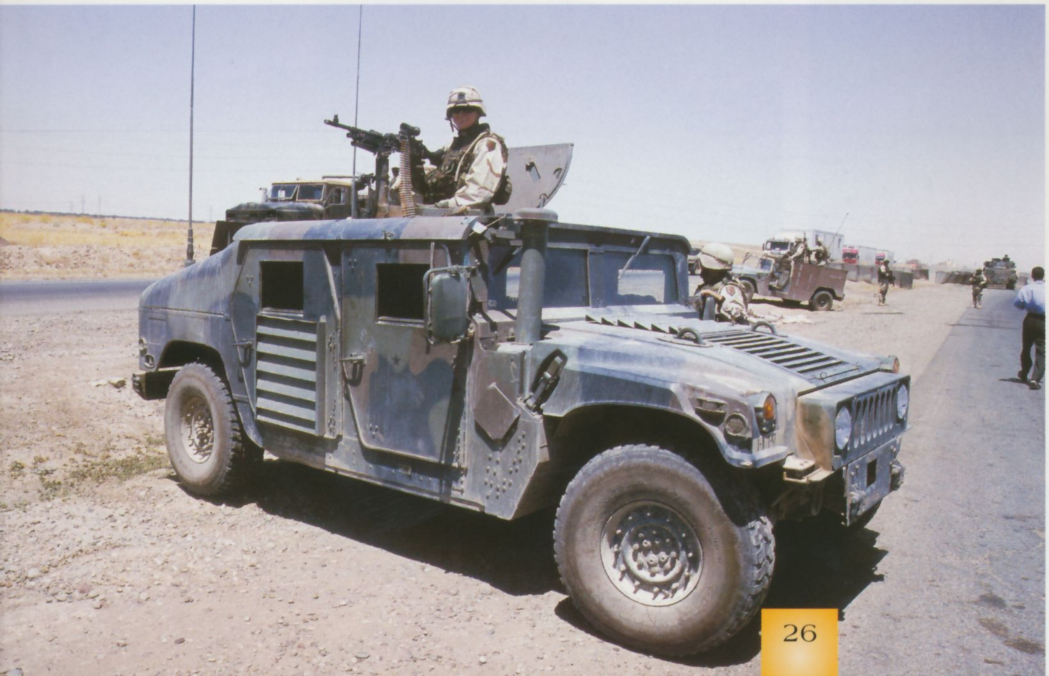
Here an M1097A2 HMMWV cargo and troop carrier with soft-top in a pickup format can be seen. The vehicle of the 5th Battalion, 20th Infantry Regiment is fitted with the two-door version of the ASK. Note the Identification Friend Foe (IFF) panels mounted on the vehicle's bonnet and behind the doors.

M1114 Up-armored HMMWV



These two M1114 Up-armored HMMWVs of Task Force 1-77 are ready to go on patrol. The vehicle on the left is armed with a 12.7mm M2A2 HB machine gun while the right one is armed with a 5.56mm M249 SAW light machine gun. Both vehicles have the Gunner Shield Kit fitted, which protects the machine gunner from the deadly effects of small arms ammunition.

Armored by O'Gara - Hess & Eisenhard, the Up-armored HMMWV M1114 is the only HMMWV version which offers its crew a decent degree of armor protection and which is available in large quantities. Initially the U.S. Army and U.S. Air Force received a total of 1,062 Up-armored HMMWV M1114s between 1995 and 1998. An additional 738 vehicles were ordered by 1998. For Operation "Iraqi Freedom" and Operation "Enduring Freedom" in Afghanistan, the U.S. Army and CENTCOM initially estimated that 1,000 Up-armored HMMWV M1114s would be required. However, the changes in the security situation on the ground resulted in a larger number of vehicles being needed. The updated requirement called for an additional 2,500 HMMWV M1114s. In May 2004, the U.S. Senate therefore approved US$618 million for the production of 9,600 additional Up-armored M1114s. Production started in May 2004, with 300 vehicles being delivered per month. In October 2004, the delivery rate was raised to 450 vehicles per month. Production will run up till March 2006.

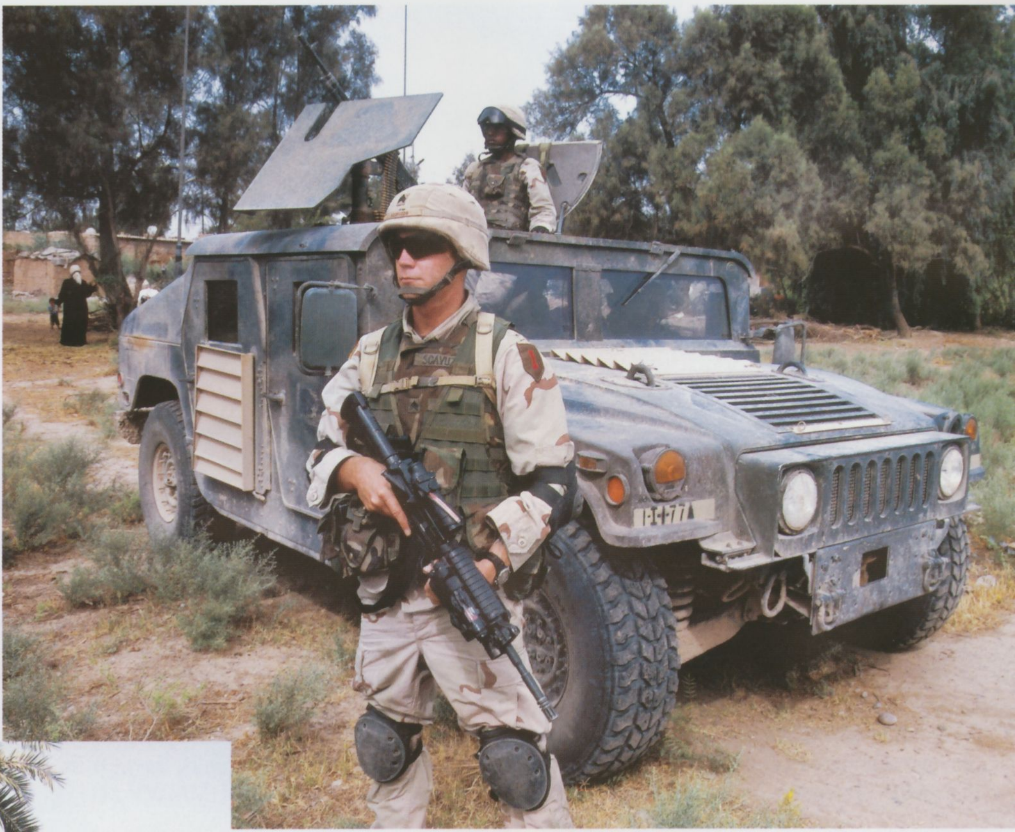


The Up-armored HMMWV M1114 offers its crew all-round protection. The doors and crew compartment are fully armored and offer protection against 7.62mm armor piercing (AP) ammunition at a stand off range of 100 meters. The armor also offers protection against the effects of 155mm splinters from air bursts. The blast protection system of the vehicle protects the crew compartment from a 12 pound contact-detonated anti-tank mine at the front of the vehicle, or a 4 pound contact-detonated

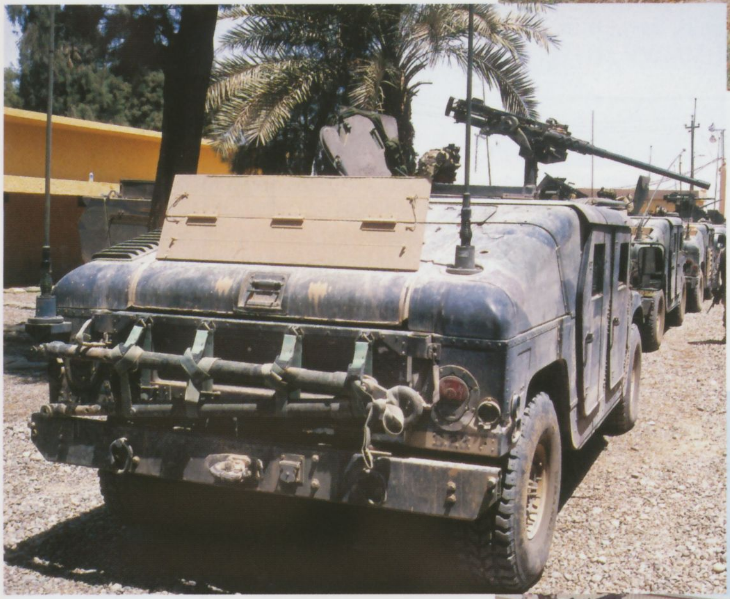
Based on the M1113 HMMWV Expanded Capacity Vehicle (ECV), the M1114 Up-armored HMMWV is the only vehicle of the HMMWV family in service with the U.S. Army which offers troops a decent degree of protection against small arms fire and IED attacks. The pictured M1114 Up-armored HMMWV belongs to Task Force 1-7, and was seen at a vehicle checkpoint on MSR Tampa north of Bayji in June 2004.

mine at the rear. The armored roof overlaps the perimeter armor and therefore the vehicle crew is protected from attacks from all possible angles. The entire armored roof assembly is mounted on shock-absorbing bushings which counter the torsion of the crew compartment caused by rough terrain. The armored doors feature operable windows with transparent armored glass which has high light transmission, also being known as "white glass". The same glass is used in the windshield assembly to which a de-icing system is fitted. The tough glass offers the same protection as the armor plates of the vehicle.

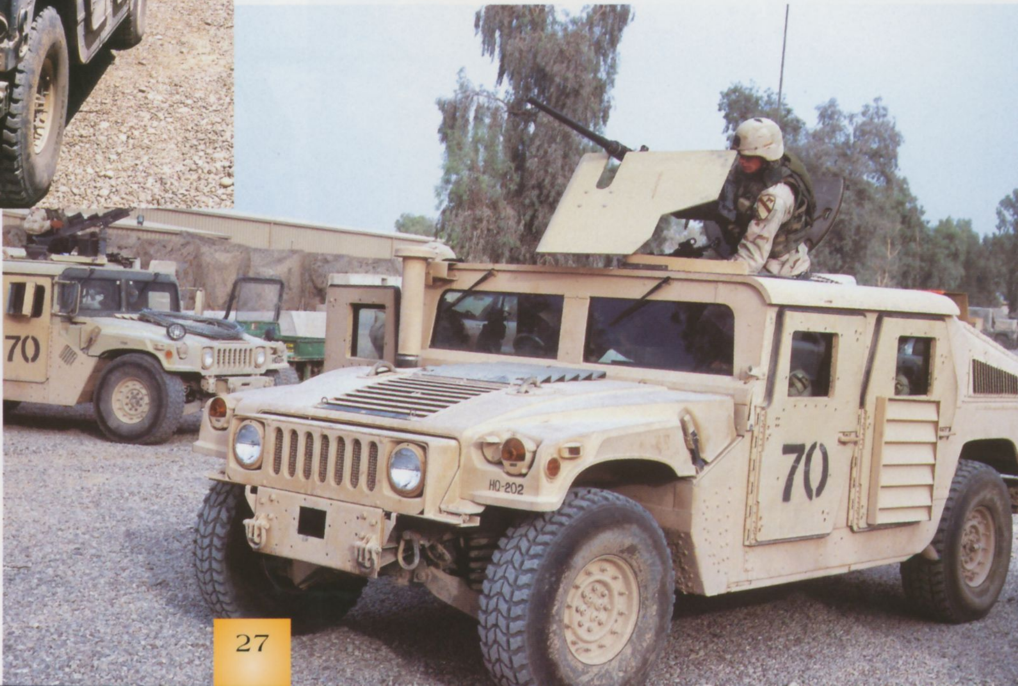
Altogether the armor package adds 2,000 pounds of weight to the standard HMMWV. The Up-armored HMMWV M1114 is based on the HMMWV M1113 Expanded Capacity Vehicle (ECV). The ECV was designed to carry heavier payloads without sacrificing the HMMWV's mobility, dependability and performance. The ECV is powered by a 6.5 liter turbocharged diesel engine which develops 190 HP at 3,400rpm. Developed from the HMMWV M998A2, the HMMWV M1113 ECV features several modifications including updated differentials, improved suspension system, modified steering system and a reinforced frame. The Up-armored HMMWV M1114 has a combat weight of 5,489kg and can reach a top speed of 125km/h. With a full tank of 94 liters of diesel fuel, the vehicle can achieve a road range of 443km. Within 26.1 seconds the vehicle can reach a speed of 80km/h. On the 16.5 x 8.25 wheels, 37x 12.5 R 16.5LT tires are mounted. The tires have a run flat range of 48km. The M1114 is 4.99m long, 2.3m wide and has a height of 1.9m.



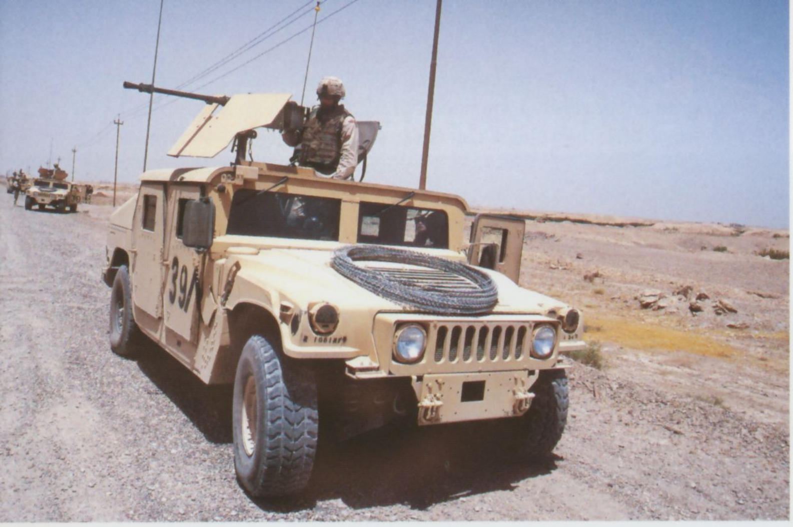
This M1114 Up-armored HMMWV belongs to C Company, 1st Battalion, 77th Armor Regiment of the 1st (U.S.) Infantry Division. The vehicle was seen during a break on a patrol in the Balad region. The vehicle is armed with a 7.62mm M240B machine gun and is fitted with a Gunner Shield Kit.



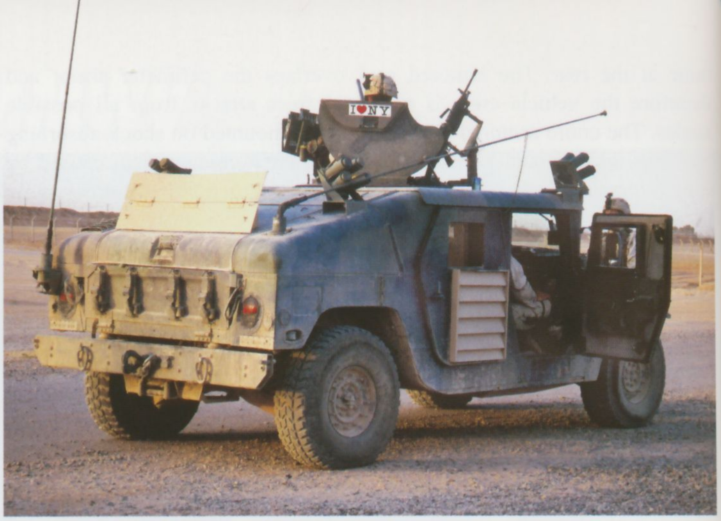
Rear view of an M1114 Up-armored HMMWV which belongs to the 1st Battalion, 77th Armor Regiment. Note the recovery kit, strapped to the vehicle's rear ready for rapid use.



This M1114 Up-armored HMMWVs belongs to a unit of the 1st (U.S.) Cavalry Division and is about to go out on patrol. The vehicle is fitted with the Gunner Shield Kit, which protects the gunner of the 12.7mm M2A2 HB machine gun. On the hood and side doors, the panels of the Identification Friend Foe system can be seen.



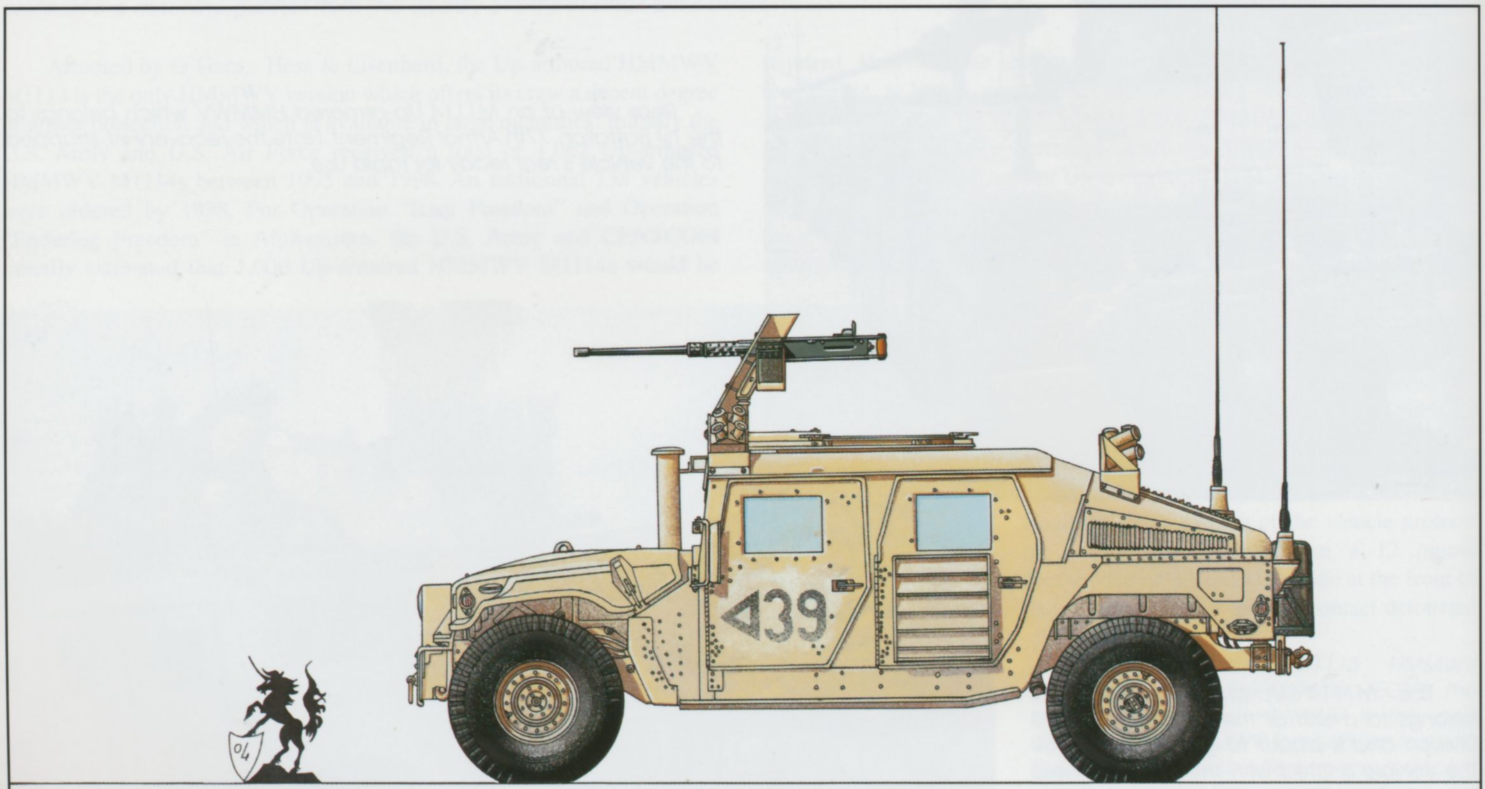
This M1114 Up-armored HMMWV belongs to a combat patrol of the 2nd Battalion, 108th Infantry Regiment of the New York Army National Guard. A standard combat patrol of the U.S. Army in Iraq is formed by four HMMWVs, and in an ideal scenario, all of these should be M1114 Up-armored HMMWVs. However, more common is a mix of soft-skinned versions and armored variants. Patrols might also have a mix of tracked vehicles and HMMWVs. For example, two M2A2 ODS Bradley Infantry Fighting Vehicles and two M1114 Up-armored HMMWVs might make up a patrol.



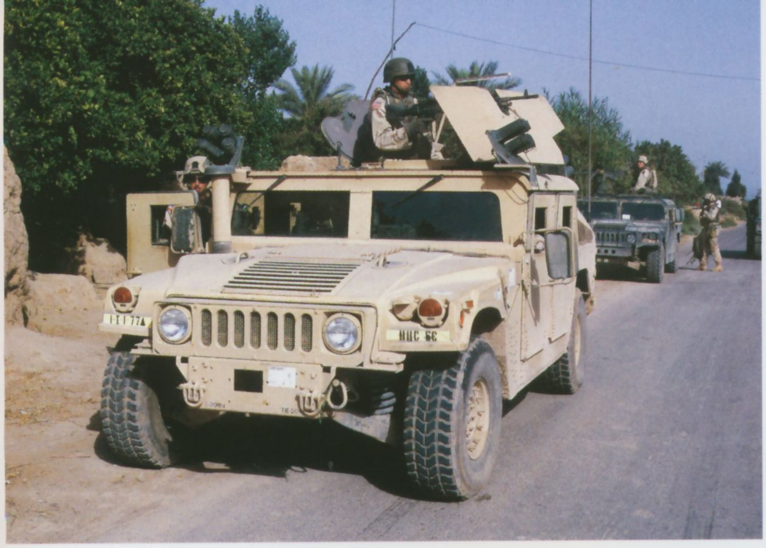
This M1114 Up-armored HMMWV belongs to the 2nd Battalion, 108th Infantry Regiment, New York Army National Guard, and was seen at Forward Operating Base (FOB) O'Ryan, 25km south of Balad. Note the "I Love New York" sticker on the vehicle's hatch. The vehicle is armed with a 12.7mm M2A2 HB machine gun and a 5.56mm M249 SAW machine gun.

From the Up-armored HMMWV M1114, O'Gara - Hess & Eisenhard developed a special version for the U.S. Air Force, the Up-armored HMMWV M1116. The basic version of the Up-armored HMMWV M1116, also known as Kit A, provides the gunner in the weapon station with 360° protection against 7.62mm AP rounds. When Kit B is fitted, overhead protection from 155mm shell bursts is added for the gunner. With Kit C, additional underbody protection for the crew is added by using ballistic steel and an armored lining on the vehicle floor. This can be bolstered to take an even harder impact by the mounting of Kit D which provides additional survivability. Finally, Kit E can be bolted on in order to provide protection for the engine compartment. The M1116 is fitted with an air-conditioning system and a noise reduction kit, plus it features an enlarged rear storage compartment and a new heating system. In the USAF, the vehicle is used by security police units and EOD units.

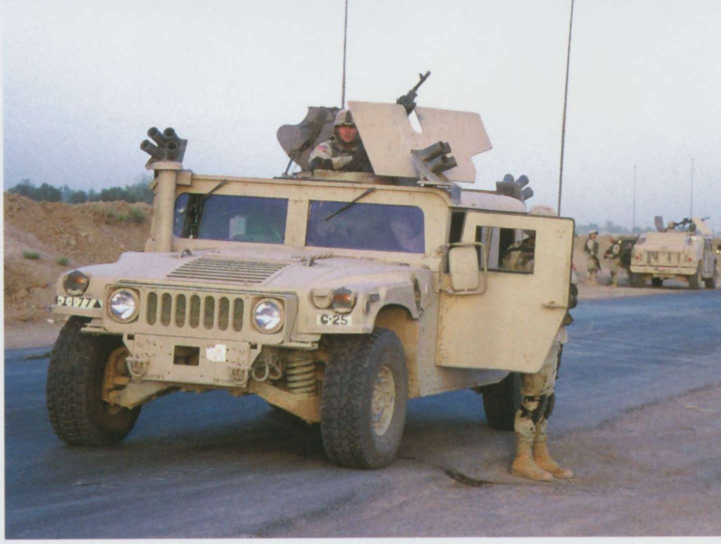
Combat units deployed under Operation "Iraqi Freedom 2" received Up-armored HMMWVs in order to give them higher flexibility for their patrolling tasks. For example, a tank company from an armor battalion received four Up-armored HMMWV M1114s per platoon in addition to each platoon's four M1 Abrams main battle tanks. Mechanized infantry units, as well as artillery and engineer units, also received Up-armored HMMWV M1114s for patrol duties.



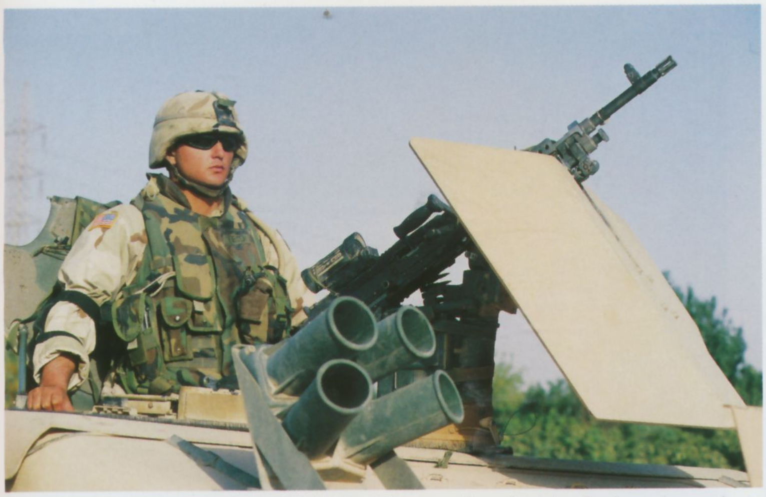
In Iraq the M1114 Up-armored HMMWV is the prime patrol vehicle for U.S. troops. Here an M1114 Up-armored HMMWV of the 2nd Battalion, 108th Infantry Regiment of the New York Army National Guard can be seen. The vehicle is colored in the standard desert camouflage color used by U.S. forces, and bears only the unit identification sign consisting of an arrowhead and the number 39. Note that the vehicle is fitted with LVOSS (Light Vehicle Obscuration Smoke System).



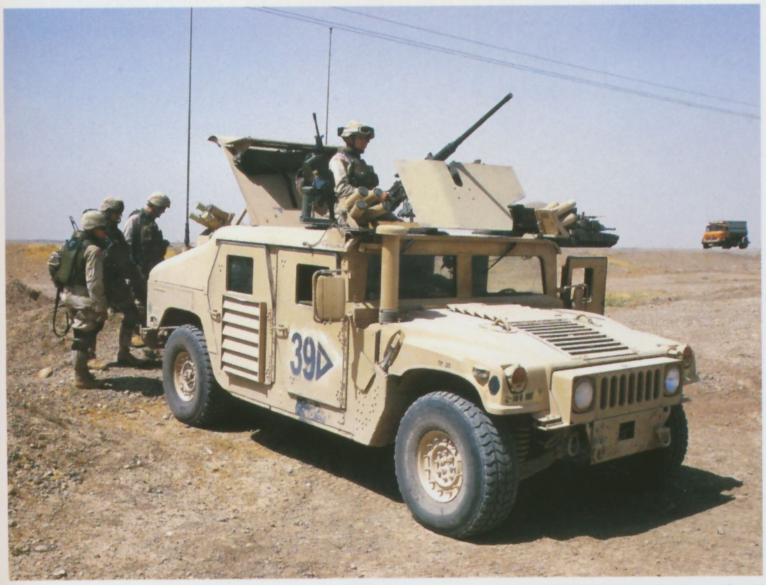
This M1114 Up-armored HMMWV of the 1st Battalion, 77th Armor Regiment is fitted with the Gunner Shield Kit and the Light Vehicle Obscuration Smoke System. The HMMWV fleet used by the U.S. Army in Iraq uses all sorts of contemporary camouflage patterns, including the NATO three-color pattern and the desert pattern using just a monotone sand color.



After troops of Task Force 1-77 discovered an IED on a road along the route of their patrol, the soldiers use their M1114 Up-armored HMMWVs to block the road of any traffic. The vehicle in front is fitted with the Light Vehicle Obscuration Smoke System (LVOSS). The LVOSS consists of four launch units with four tubes each. The launch units are mounted on the vehicle's roof and face in various directions. When the vehicle is attacked the LVOSS makes it possible to fire smoke rounds, which in seconds, builds up a smokescreen. This smoke then obscures the vehicle so that an attacker can not take accurate aim any more.

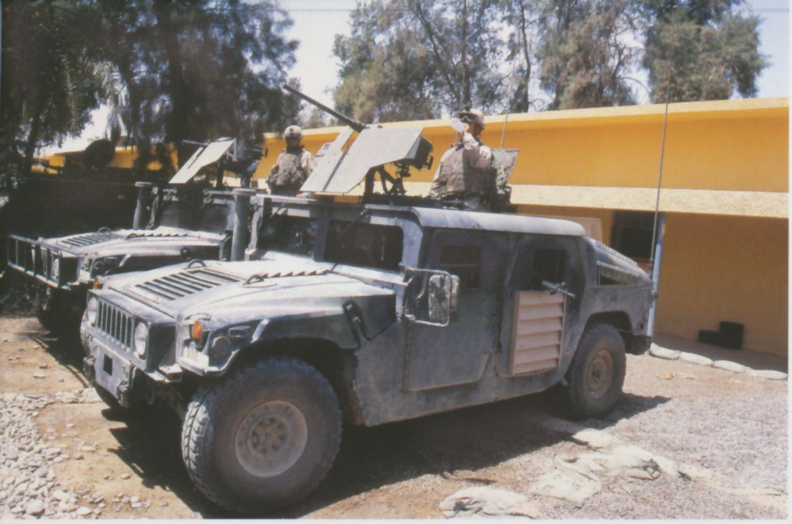


Each of the four Light Vehicle Obscuration Smoke System launchers fitted to the M1114 Up-armored HMMWVs, consists of four 66mm launcher tubes. In addition to smoke grenades, LVOSS is also able to fire high fragmentation rounds or non-lethal rounds filled with rubber bullets.

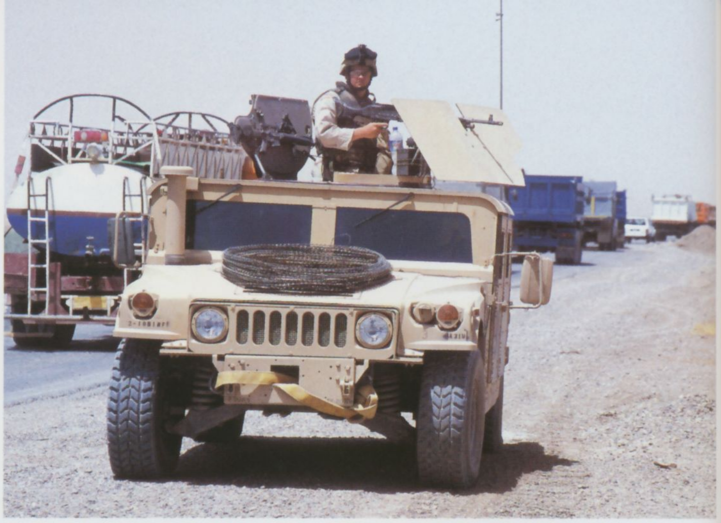


Another picture of an M11114 Up-armored HMMWV of the 2nd Battalion, 108th Infantry Regiment of the New York Army National Guard. Note the IFF panels, LVOSS, Gunner Shield Kit and the ballistic protection shield on the large rear cargo hatch. The vehicle is armed with a 12.7mm M2A2 HB machine gun.

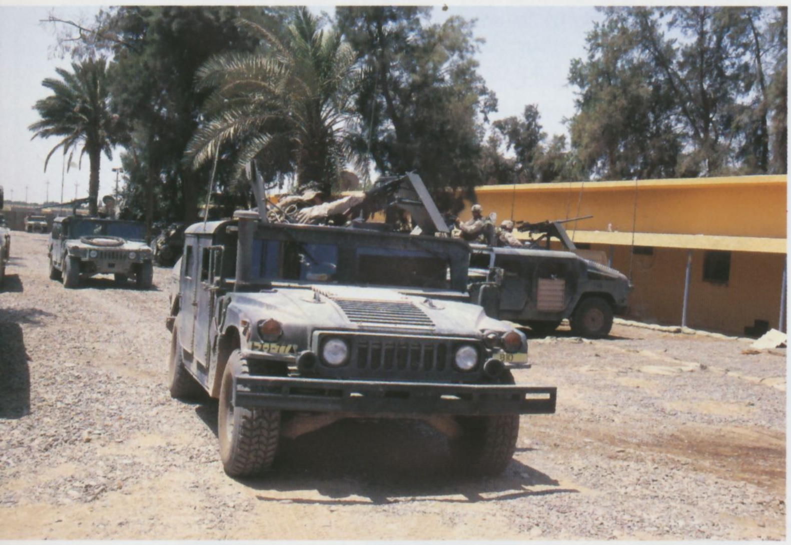
During an IED search patrol, GIs of Task Force 1-77 take cover behind their M1114 Up-armored HMMWV. The M1114 Up-armored HMMWV offers full perimeter protection against 7.62mm armor piercing (AP) ammunition at a stand off range of 100 meters, as well as against 155mm splinters from air bursts.



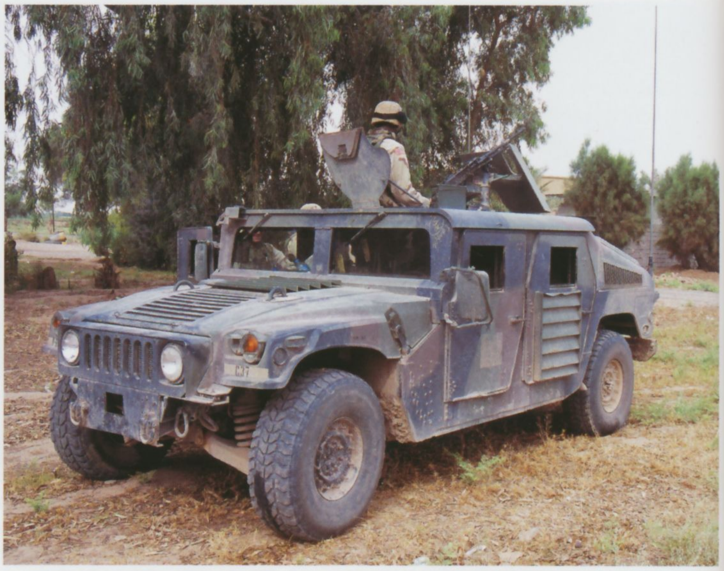
A patrol of B Company, 1st Battalion, 77th Armor Regiment, prepares to leave Camp Paliwoda in June 2004. It is important to note that most armored units received M1114 Up-armored HMMWVs in addition to their tanks for patrol duties. The second vehicle is fitted with a 40mm Mk.19 automatic grenade launcher, while the first is armed with a 12.7mm M2A2 HB machine gun. Both vehicles are fitted with the Gunner Shield Kit.



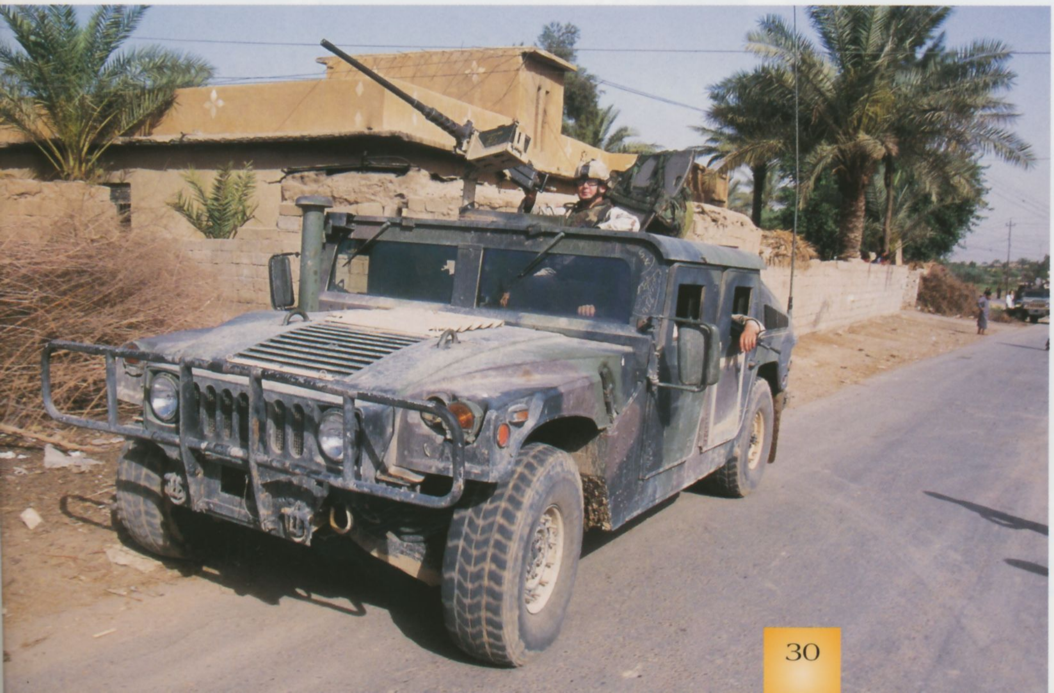
Based on the M1113 Expanded Capacity Vehicle, the M1114 Up-armored HMMWV offers its crew all-round armor protection. The vehicle's armor package adds 2,000 pounds of weight to that of the basic HMMWV, bringing its total combat weight to 5,489kg. The blast protection system of the vehicle protects the crew compartment from a 12 pound anti-tank mine at the front of the vehicle, or a 4 pound mine at the rear.



Another M1114 Up-armored HMMWV from the same patrol. The vehicle is a good example of unit level modifications carried out by U.S. troops on their vehicles. This particular HMMWV has been fitted with a "homemade" front bumper. Note also the infra red lights which are used during night operations.

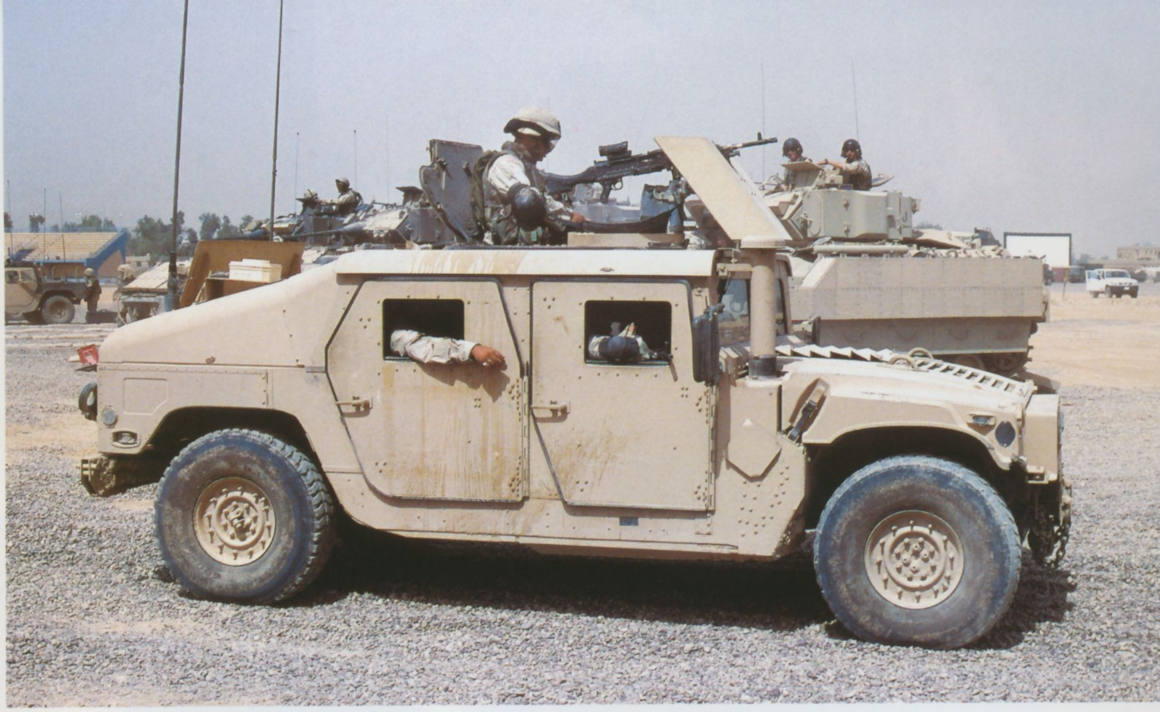


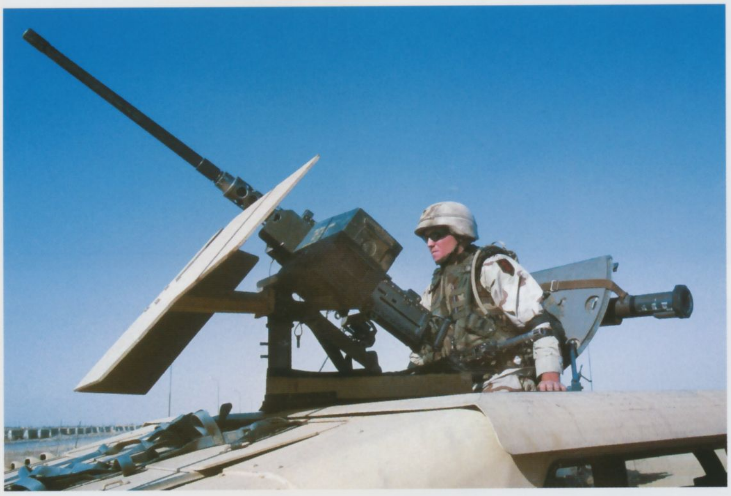
Side view of an M1114 Up-armored HMMWV of Task Force 1-77. The vehicle is painted in the three-tone NATO camouflage pattern. Evident in this picture are the armored doors which feature opening windows, seen here lowered by the crew.



Following a daily routine, an M1114 Up-armored HMMWV of the 2nd Battalion, 108th Infantry Regiment of the New York Army National Guard passes through a small village in central Iraq. Even if it seems routine, passing through a village or driving through the countryside anywhere in Iraq can lead to an ambush. Regularly during patrols, U.S. units are fired on from rooftops, windows or from behind walls. In some cases ambushes lead to fire fights several hours long.

Another side view of an M1114 Up-armored HMMWV of Task Force 1-77. This vehicle is painted in a sand color camouflage. The vehicle is fitted with the Gunner Shield Kit. Note the IFF panel mounted on the vehicle's hood.

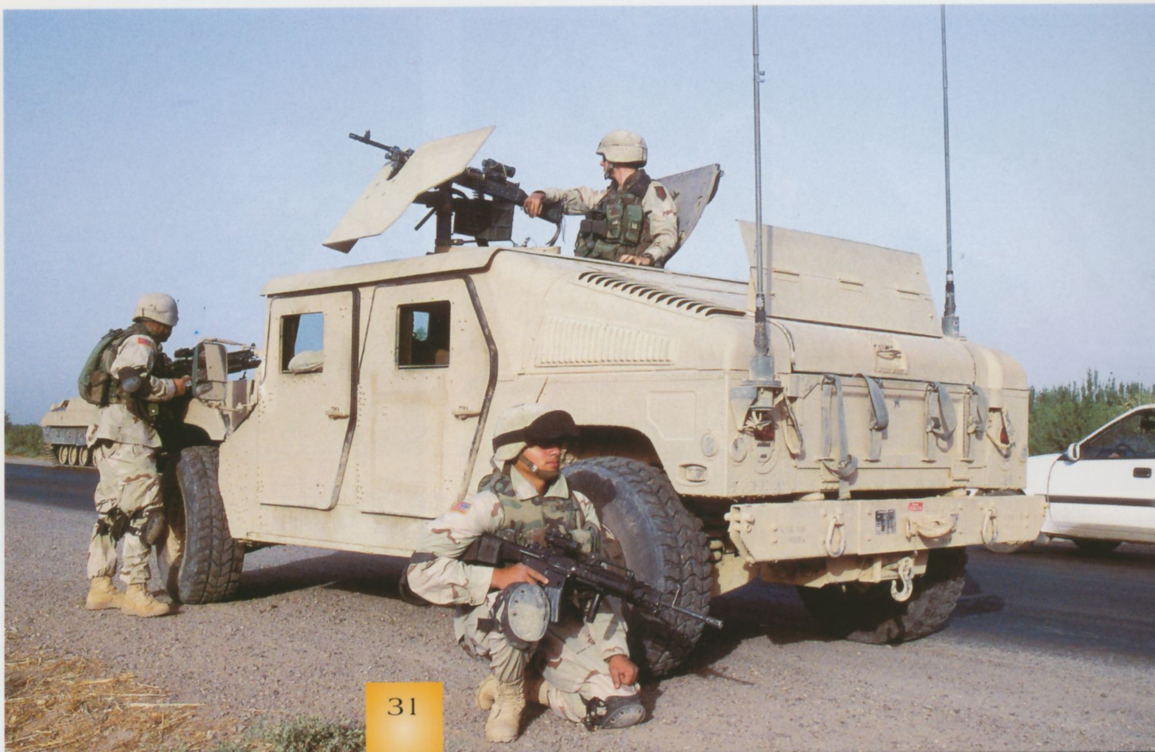


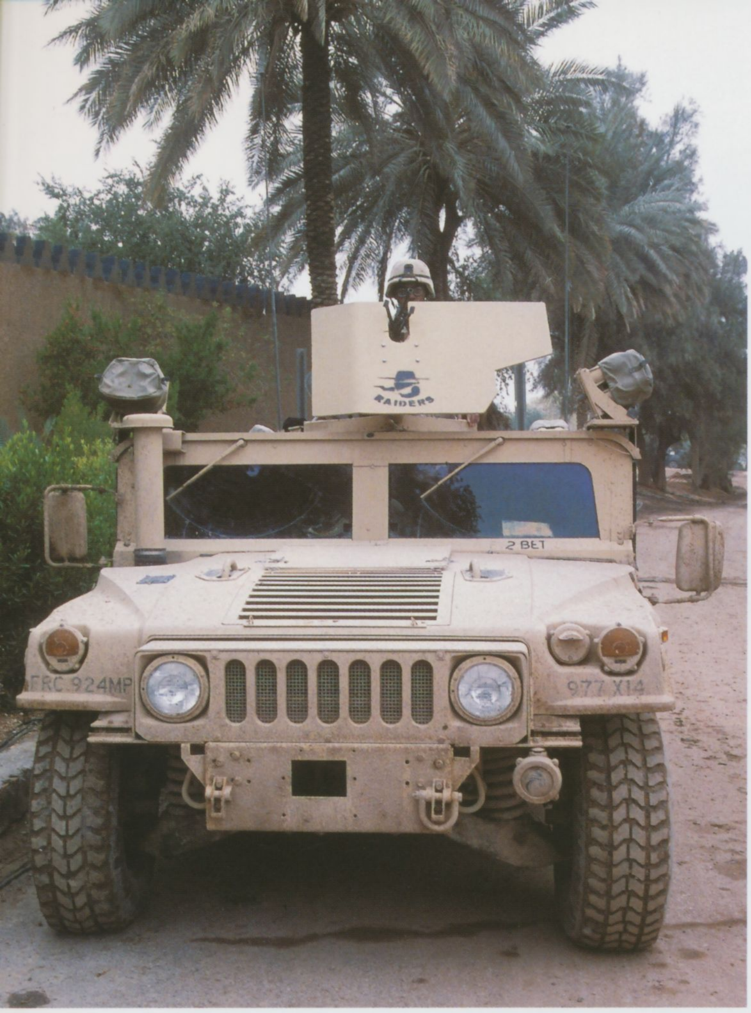


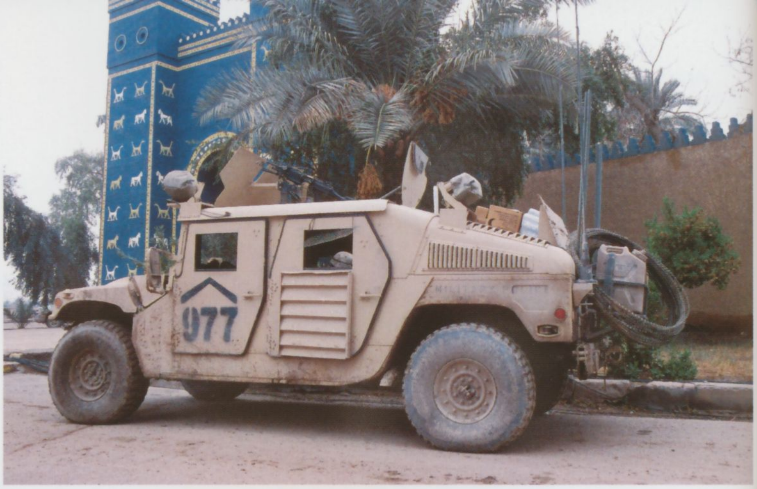
Various weapons can be mounted on the M1114 Up-armored HMMWV's thirty-two inch MK64 Mod. 9 machine gun mount and M197 weapon cradle mount. In this case the weapon is a 12.7mm M2A2 HB machine gun.

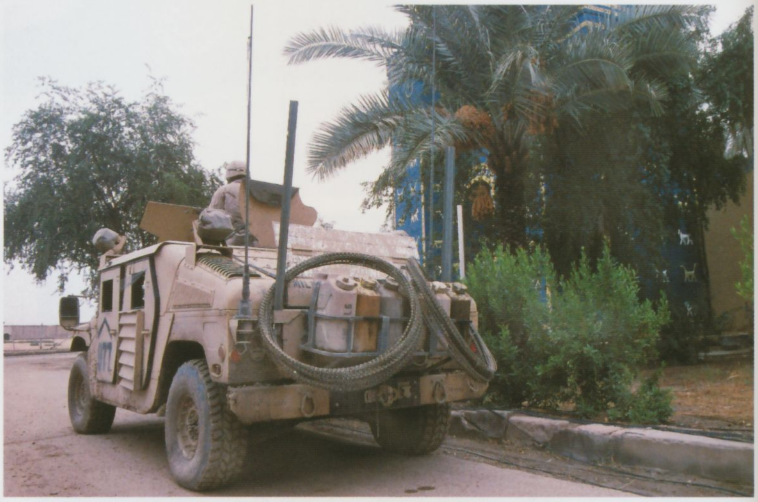
Here an M1114 Up-armored HMMWV of the Headquarters Company of the 1st Battalion, 77th Armor Regiment, passes through a small village in central Iraq during Operation "Rocketman 2" in May 2004.

This M1114 Up-armored HMMWV is fitted with a ballistic protective shield on its large rear cargo hatch. In typical GI slang, this ballistic shield is called a "Don't Shoot Me Panel". This vehicle belongs to a patrol of C Company "Charlie Pain", 1st Battalion, 77th Armor Regiment.

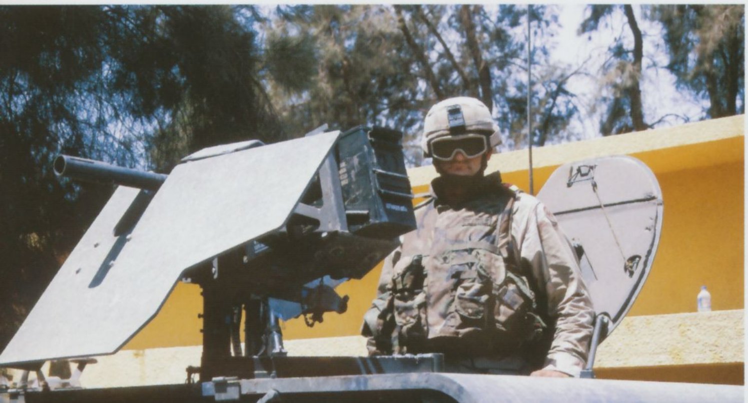




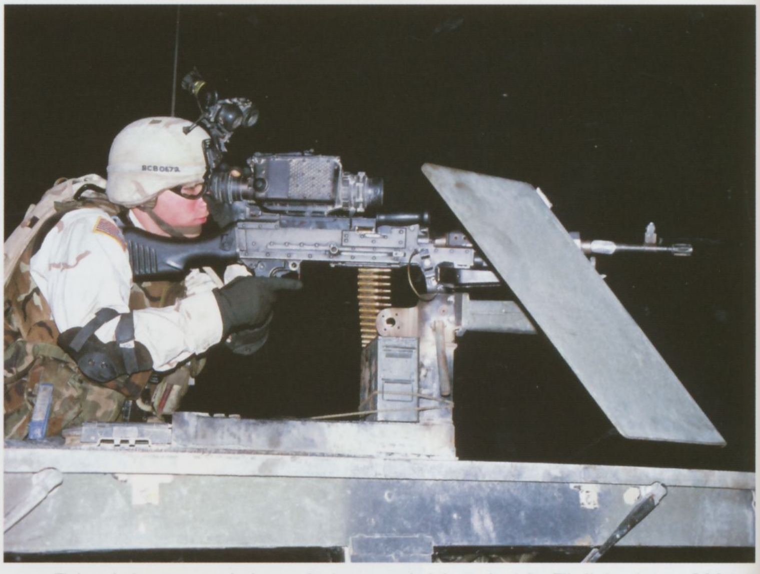




Seen at Camp Babylon near Al Hilla, this M1114 Up-armored HMMWV belongs to the 977th Military Police Company of the 924th Military Police Battalion. The Fort Riley based Company is nicknamed "Raiders", and this nickname along with a masked gunman can be seen painted on the vehicle's Gunner Shield Kit. The vehicle is fitted with the Identification Friend Foe panels and the Light Vehicle Obscuration Smoke System. On the rear, a storage rack big enough to carry six water cans is mounted. Note the way the razor wire coils are stowed by using metal bars, of the type usually reserved for constructing field fortifications. On the vehicle's weapon mount is a 5.56mm M249 SAW. The 'X' in the vehicle's bumper code identifies the vehicle as an armor-protected vehicle.

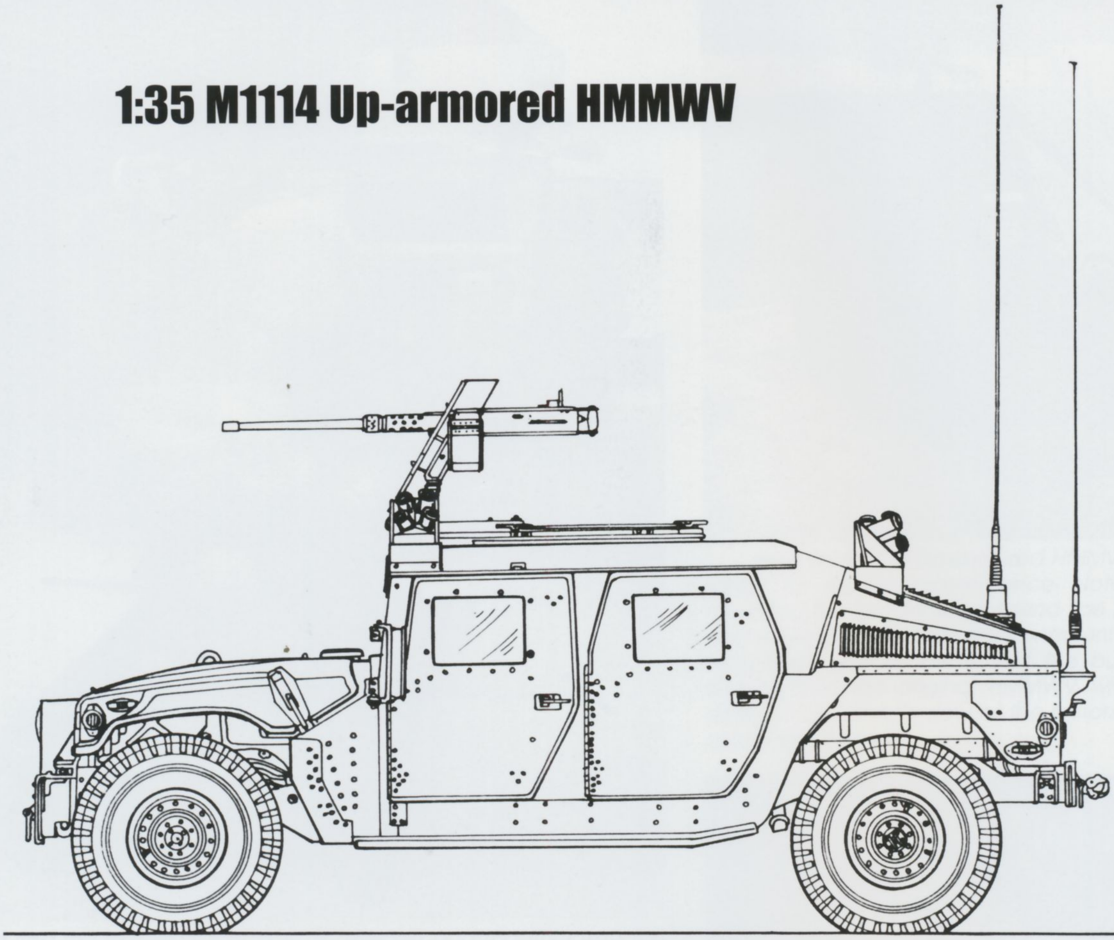


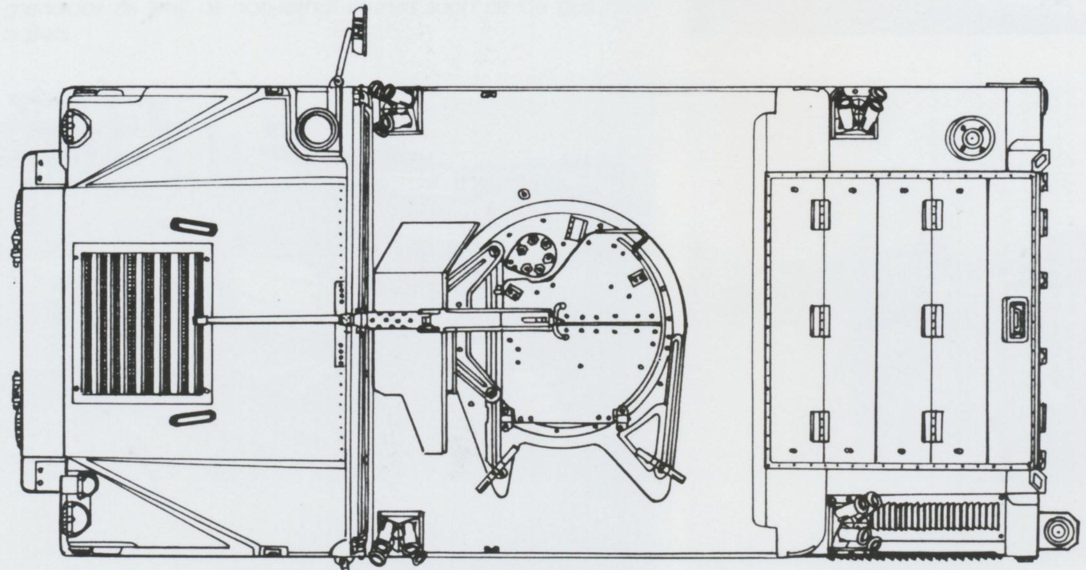
Most M1114 Up-armored HMMWVs are fitted with the Gunner Shield Kit. The kit is fitted to the HMMWV's thirty-two inch MK64 Mod. 9 machine gun mount and M197 weapon cradle, and protects the gunner from standard infantry ammunition. The Gunner Shield Kit has a weight of 113lbs. On this vehicle's universal M197 weapon cradle mount, a 40mm Mk.19 automatic grenade launcher can be seen mounted.

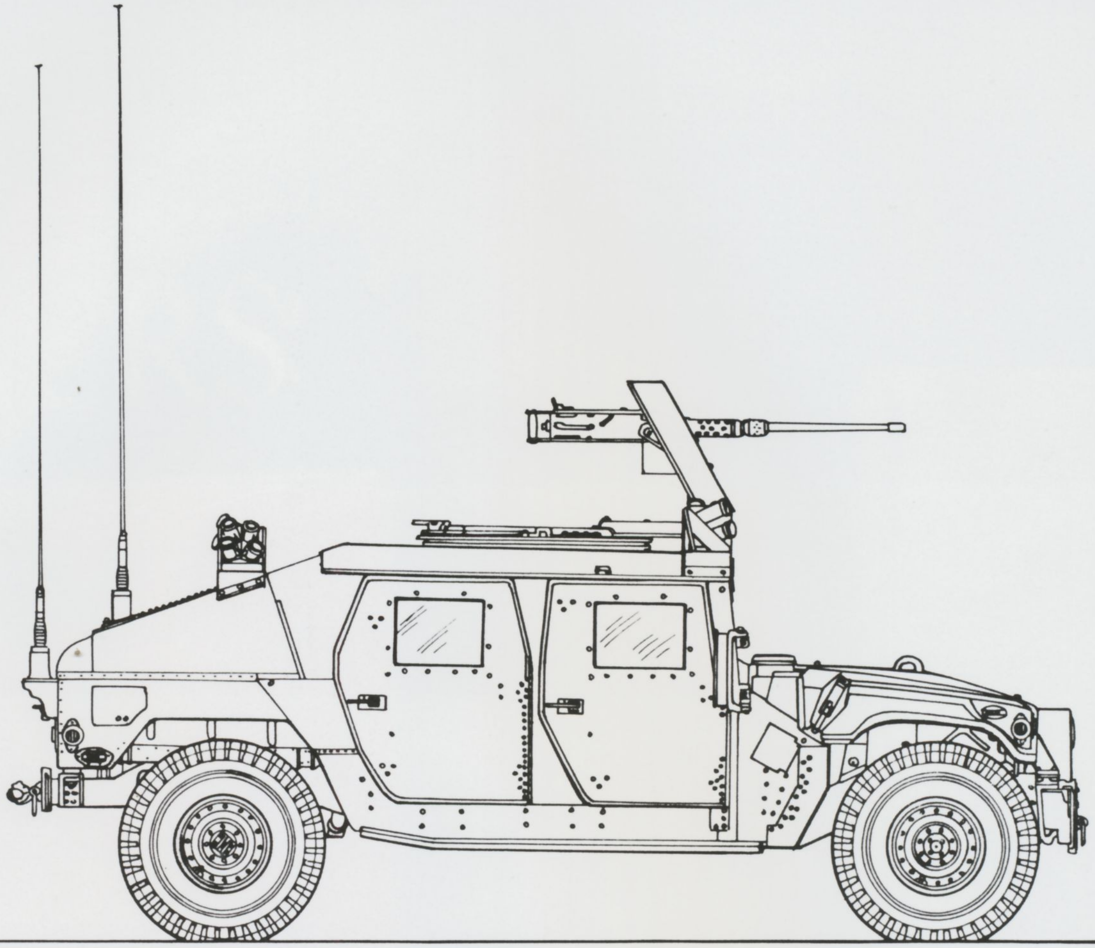


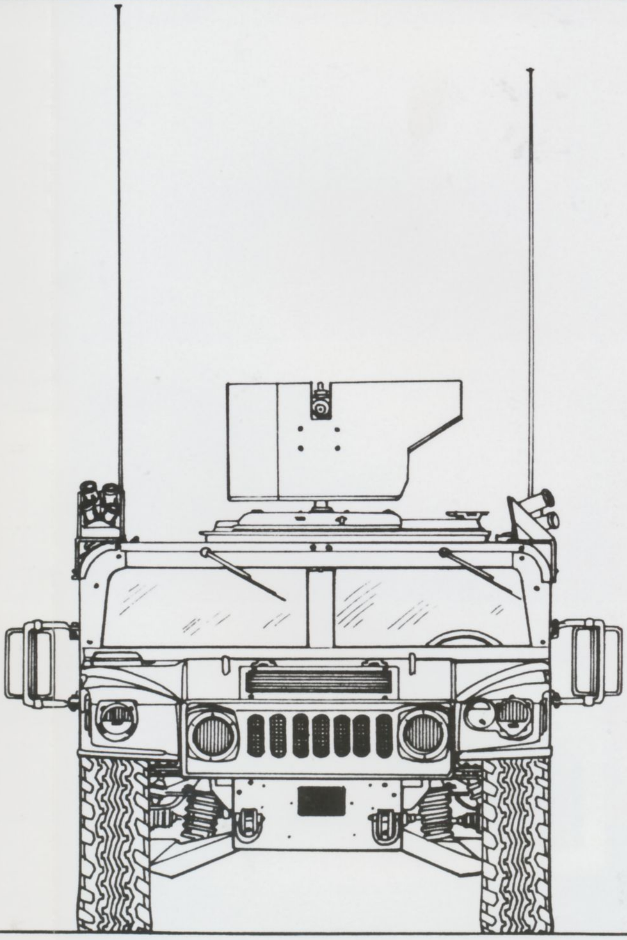
This picture was taken during a night patrol in Tikrit in June 2004. It shows a soldier of the 1st Battalion, 18th Infantry Regiment, manning a 7.62mm M240B machine gun mounted on an M1114 Up-armored HMMWV. The machine gun is fitted with a thermal imaging sight.

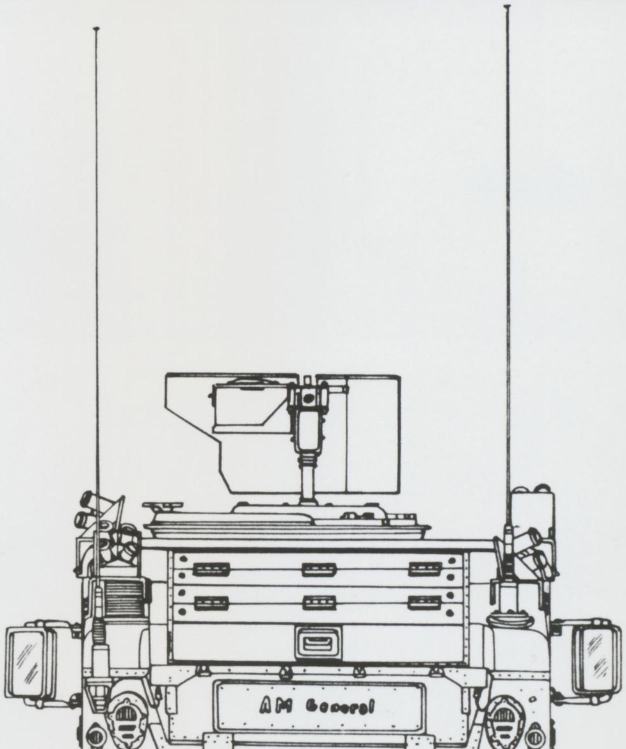
1:35 M1114 Up-armored HMMWV







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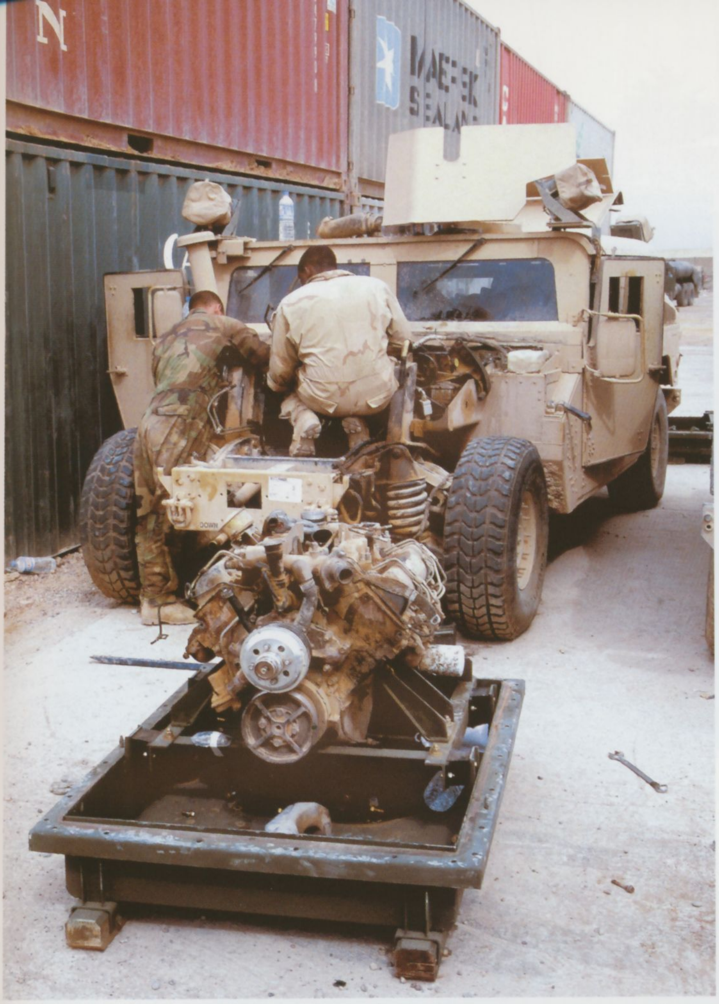
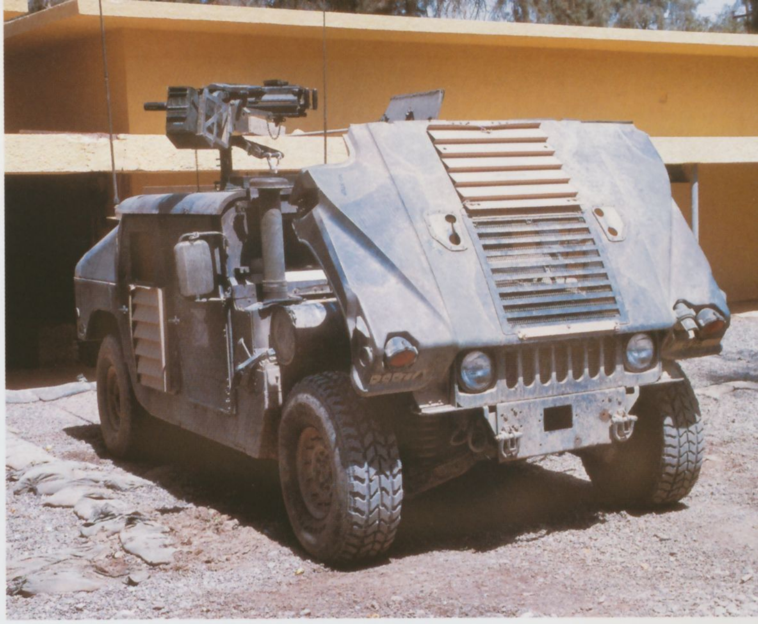
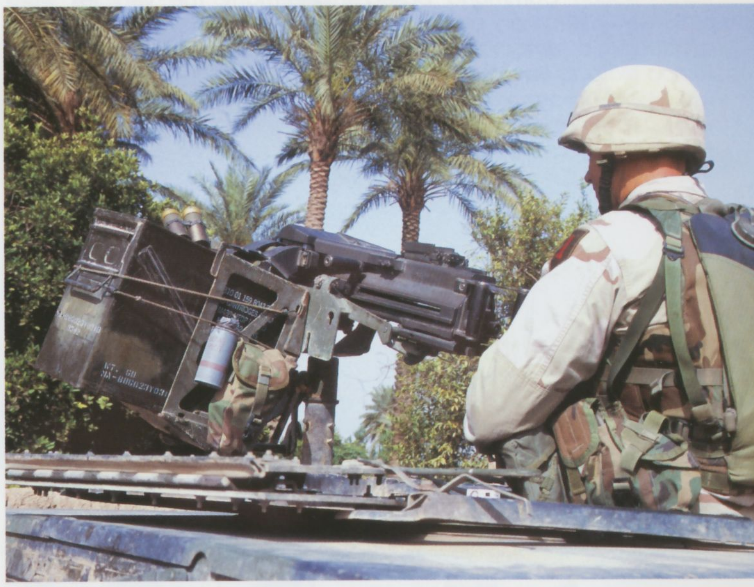


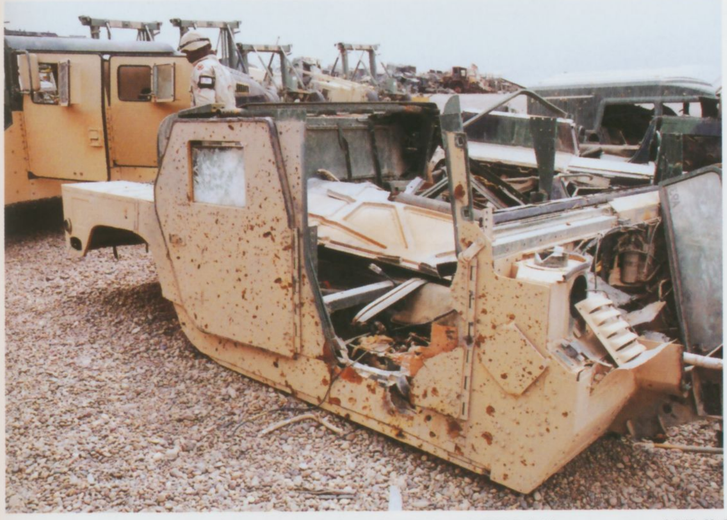
In Iraq the HMMWVs see a lot of mileage, and together with the heat and dust, this can eventually culminate in an engine breakdown. Here mechanics can be seen working on an M1114 Up-armored HMMWV in order to bring the vehicle back to a serviceable condition. In the foreground can be seen the vehicle's 6.5 liter V-8 turbocharged diesel fuel injection engine after it was removed by mechanics.

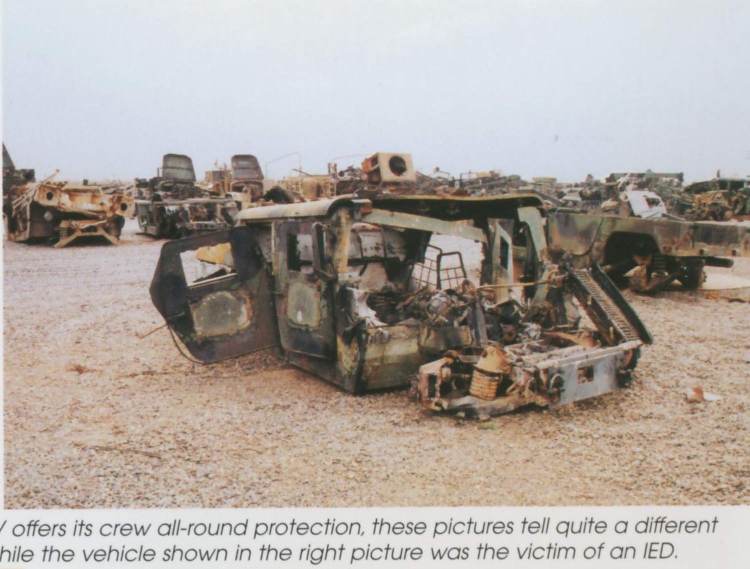


Here an M1114 Up-armored HMMWV can be seen with its hood raised for regular maintenance. Note the common practice of mounting the Identification Friend Foe panel on the hood without its frame. Also illustrated are the low mounted truck mirrors. The reason for mounting them so low is that the bulletproof windows are much smaller than the original HMMWV windows, and would therefore obstruct the driver's view of the mirrors if they were mounted in the usual high fashion.

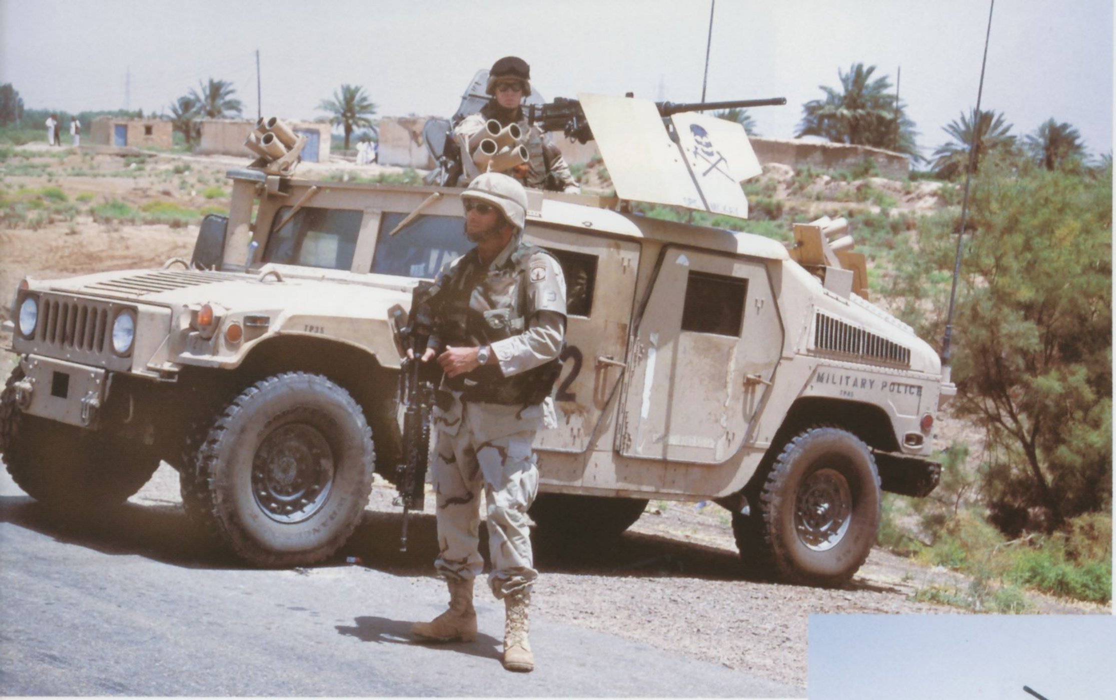


Close-up of a 40mm Mk.19 automatic grenade launcher mounted on the HMMWV's thirty-two inch MK64 Mod. 9 machine gun mount and M197 weapon cradle mount. The Mk.19 automatic grenade launcher has an effective range of 1,500m, and can fire at a cyclic rate of 300 to 400 rounds per minute. Ammunition available for the weapon includes high explosive rounds, armor piercing rounds, smoke grenades as well as non-lethal rounds such as CS gas and rubber bullets.

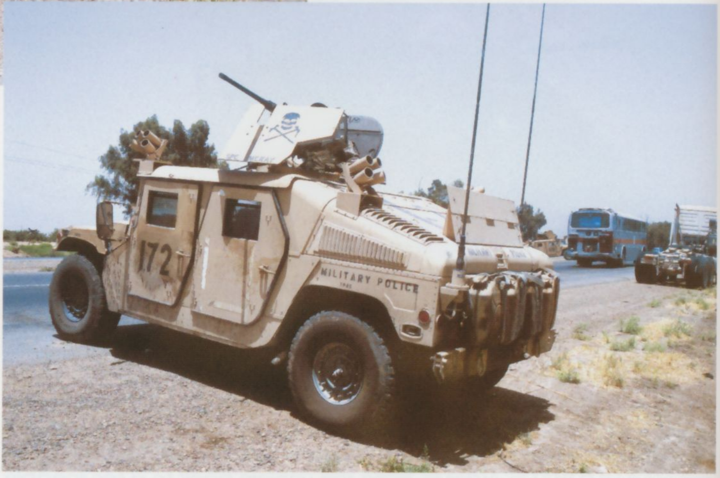


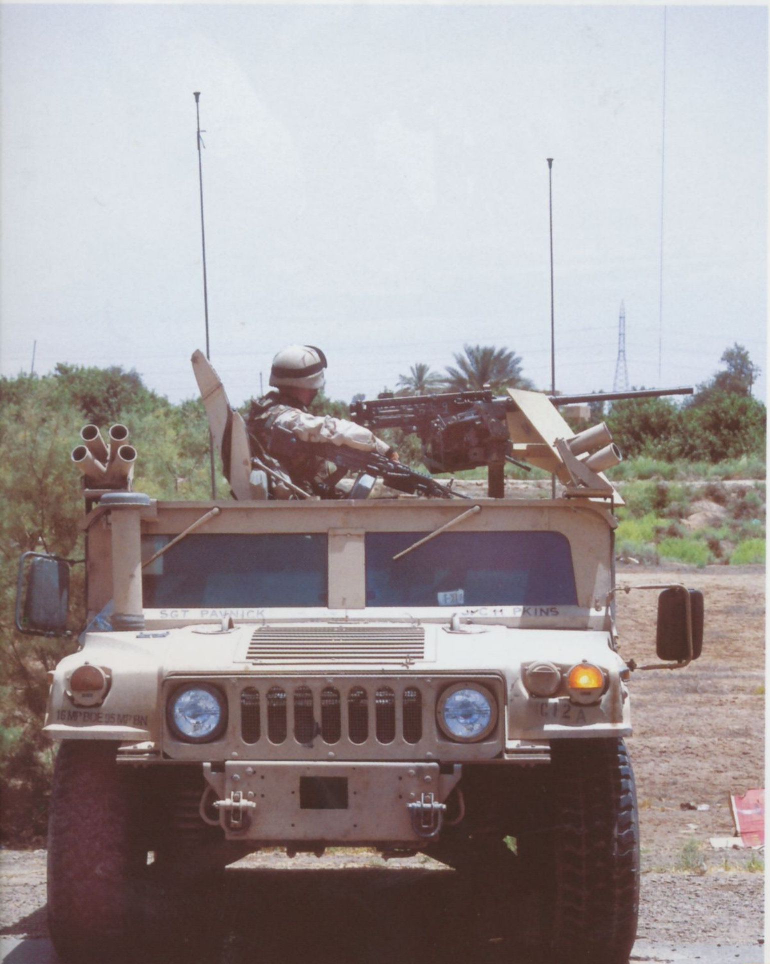


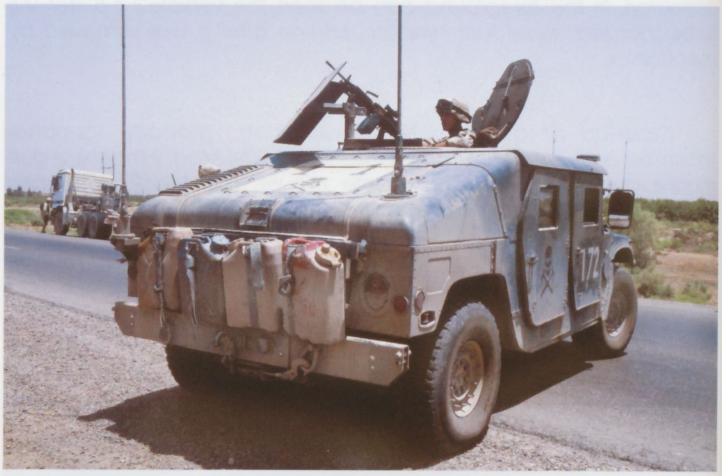
While the manufacturer claims that the M1114 Up-armored HMMWV offers its crew all-round protection, these pictures tell quite a different story. The vehicle in the left picture was probably hit by an RPG round, while the vehicle shown in the right picture was the victim of an IED.

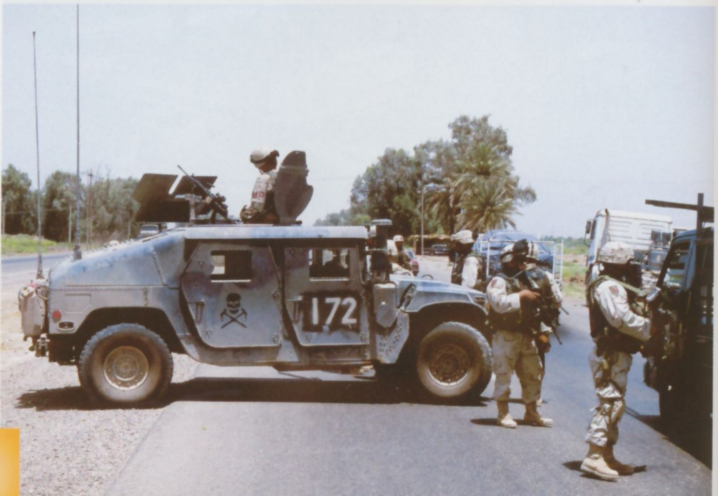


These pictures show M1114 Up-armored HMMWVs of the 95th Military Police Battalion. For Operation "Iraqi Freedom 2", the battalion was cross-attached to 16th Military Police Brigade (Airborne) of the XVIII Airborne Corps, which is based at Fort Bragg, North Carolina. Usually the 95th Military Police Battalion forms part of the 37th Transportation Command based in Germany. The vehicles were pictured while military policemen of the 95th Military Police Battalion conducted a temporary vehicle checkpoint on Main Supply Road Tampa close to Balad. Military Police units were the first to be issued with M1114 Up-armored HMMWVs when the vehicles entered service with the U.S. Army. Since the Kosovo operations and the beginning of Operation "Iraq Freedom", the Up-armored HMMWVs were also issued to other units. Note the skull and crossbones badge used by the 95th Military Police Battalion.

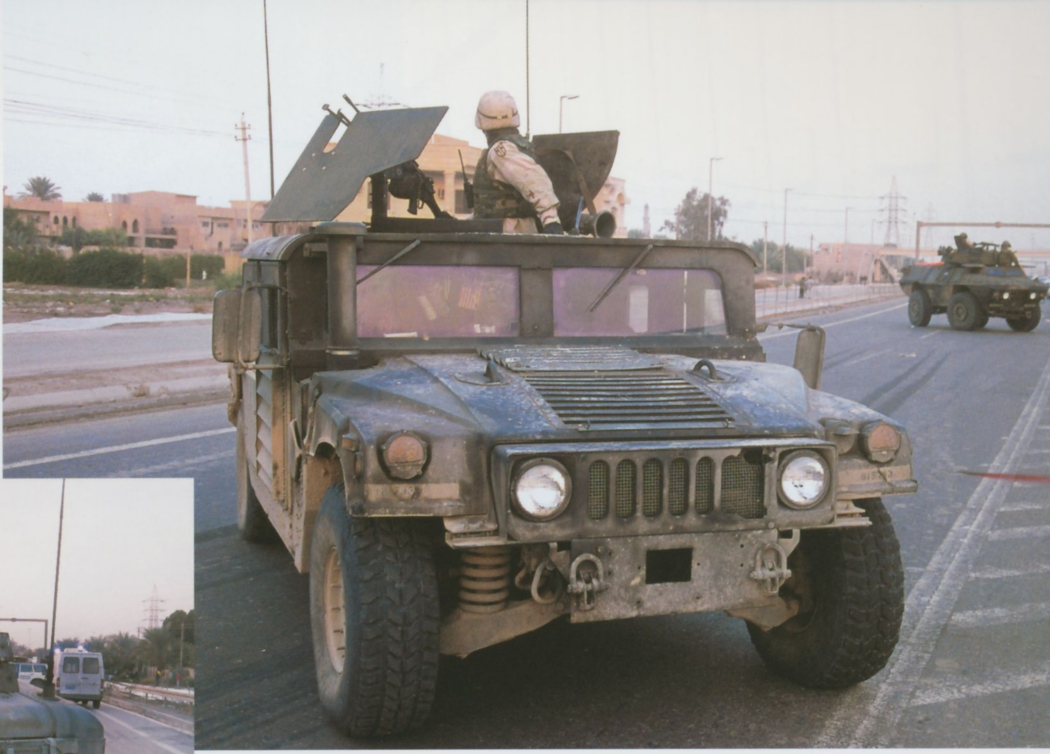


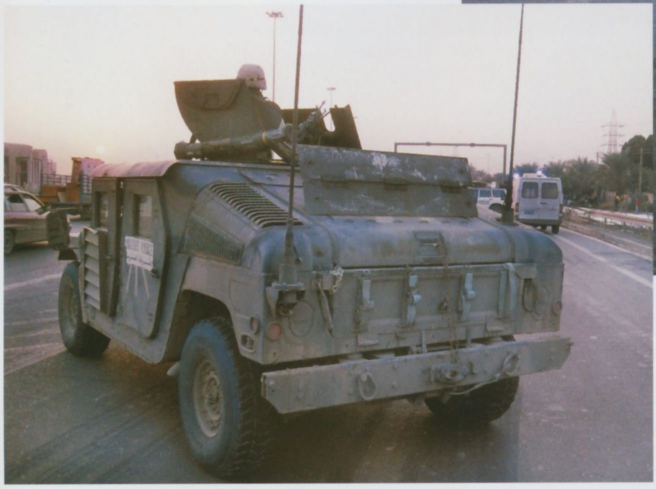


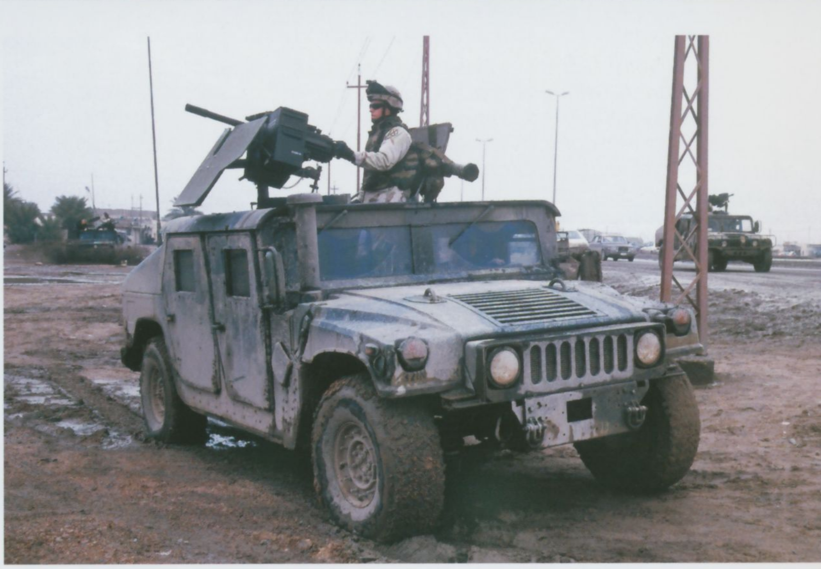




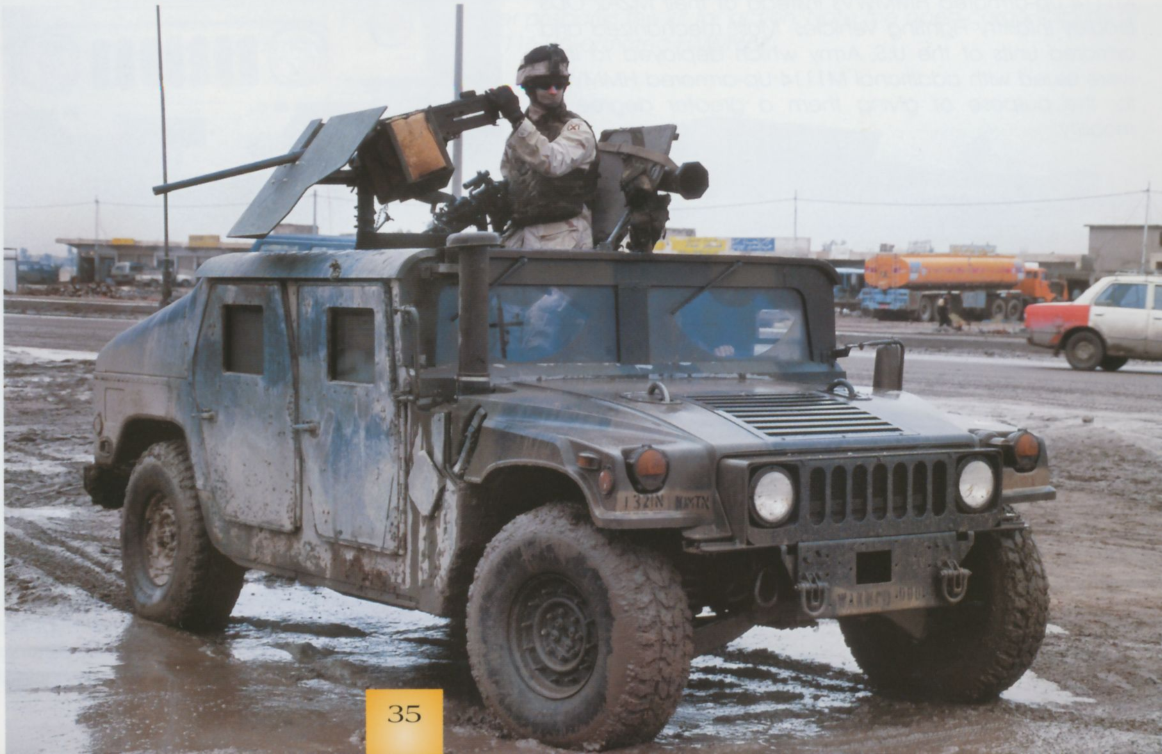
This M1114 Up-armored HMMWV of the 793rd Military Police Battalion ("Spartans") of the 18th Military Police Brigade, was seen on a highway leading from Jordan to Baghdad in November 2003. The soldiers of the Germany based unit have just closed a lane of the crowded motorway in order to investigate a traffic accident. Their HMMWVs provide a useful road block for this type of mission. Note that the HMMWV is fitted with a Gunner Shield Kit and a ballistic shield on the vehicle's rear cargo hatch.



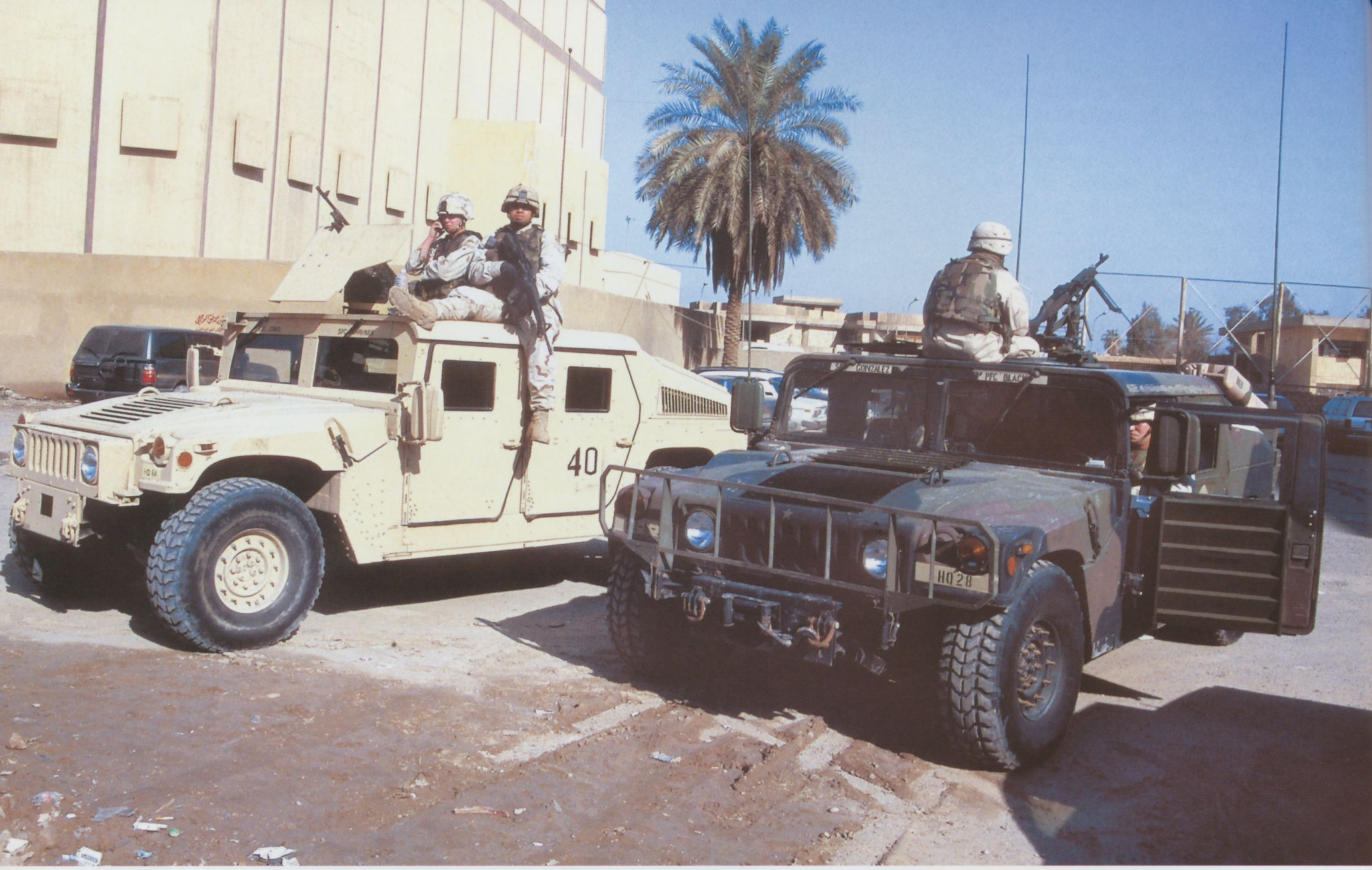




This M1114 Up-armored HMMWV belongs to the 1st Battalion, 32nd Infantry Regiment of the 10th (U.S.) Mountain Division, is out on patrol in Al Iskanderiyah in November 2003. The vehicle is seen during an IED patrol. Every morning in Iraq at around 0400 hours, patrols leave their bases in order to conduct the dangerous task of clearing Iraqi roads from IEDs placed by anti-coalition fighters. This M1114 Up-armored example is armed with a 40mm Mk.19 automatic grenade launcher.

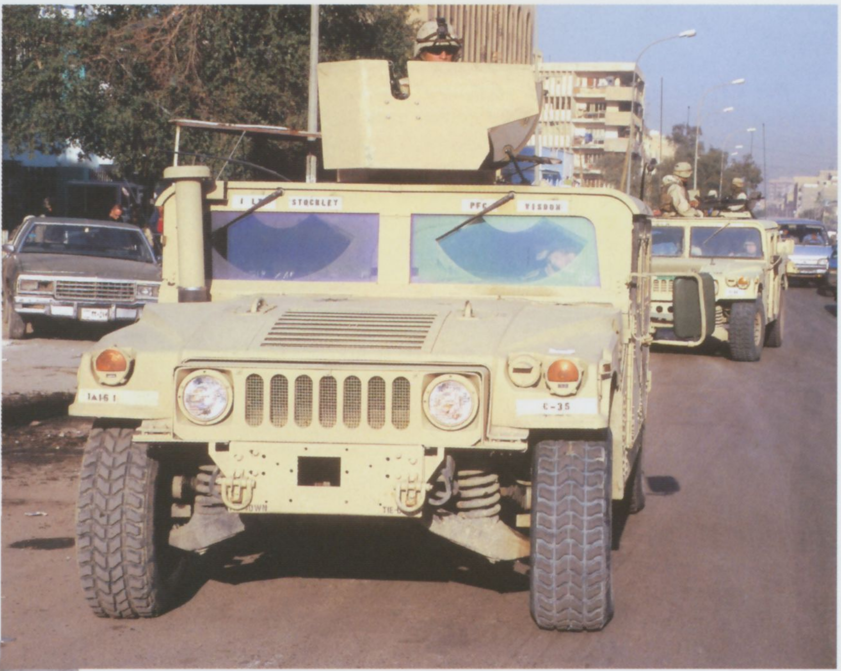


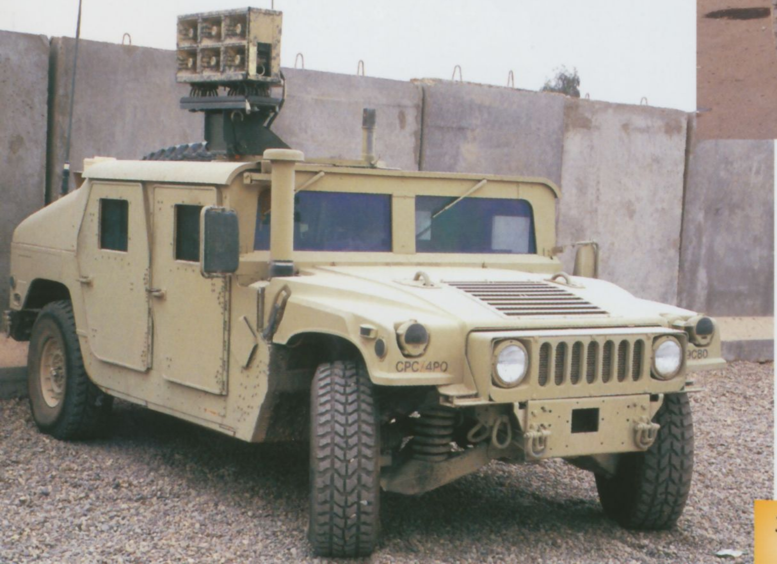
Another M1114 Up-armored HMMWV of an IED patrol of the 1st Battalion, 32nd Infantry Regiment. This vehicle is armed with a 12.7mm M2A2 HB machine gun. Note the Gunner Shield Kit and the AT-4 antitank weapon added to the top of the gunner's single-piece hatch.



Baghdad city center, December 2003. These two HMMWVs belong to the 1st Battalion, 6th Infantry Regiment of the 1st (U.S.) Armored Division. The vehicle on the left in desert camouflage is an M1114 Up-armored HMMWV fitted with the Gunner Shield Kit, while the vehicle on the right in three-tone camouflage is an M1026A1 HMMWV armament carrier with basic armor and winch. The M1026A1 is fitted with a brush guard and IFF panels.

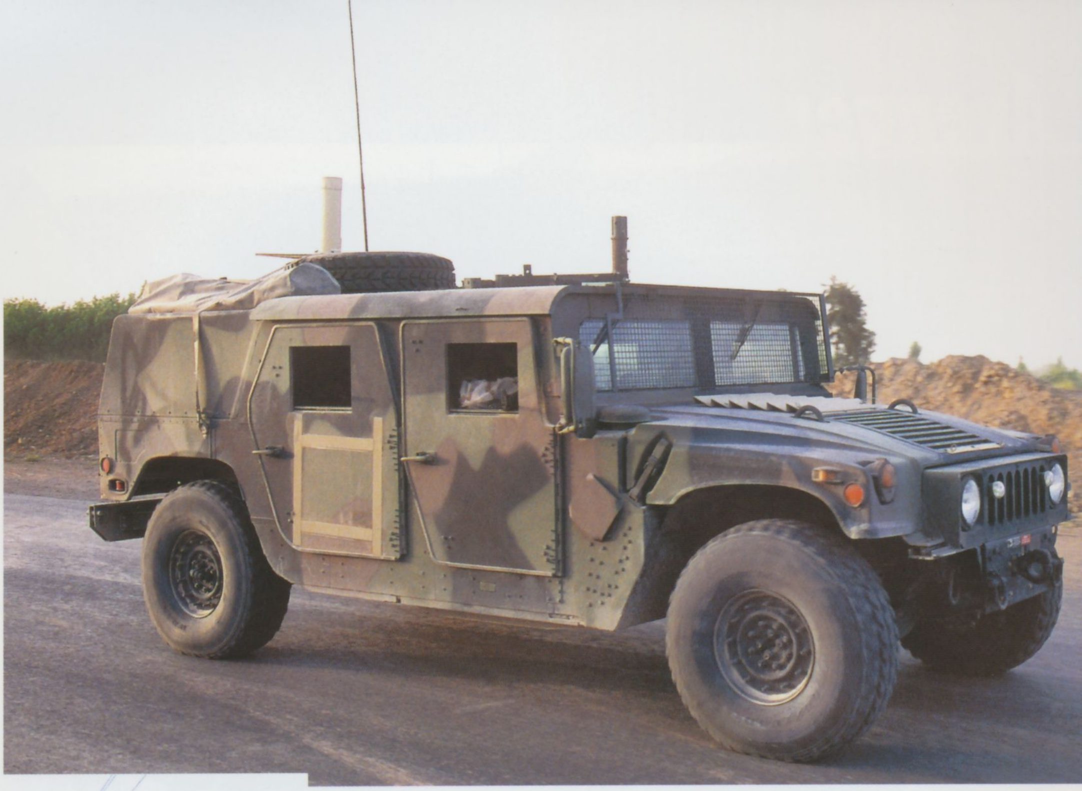
In December 2003, troops of the 1st (U.S.) Armored Division patrol in the city of Baghdad. In this case the soldiers of the 1st Battalion, 6th Infantry Regiment, use M1114 Up-armored HMMWVs instead of their M2A2 ODS Bradley Infantry Fighting Vehicles. Most mechanized and armored units of the U.S. Army which deployed to Iraq were issued with additional M1114 Up-armored HMMWVs for the purpose of giving them a greater degree of mobility.

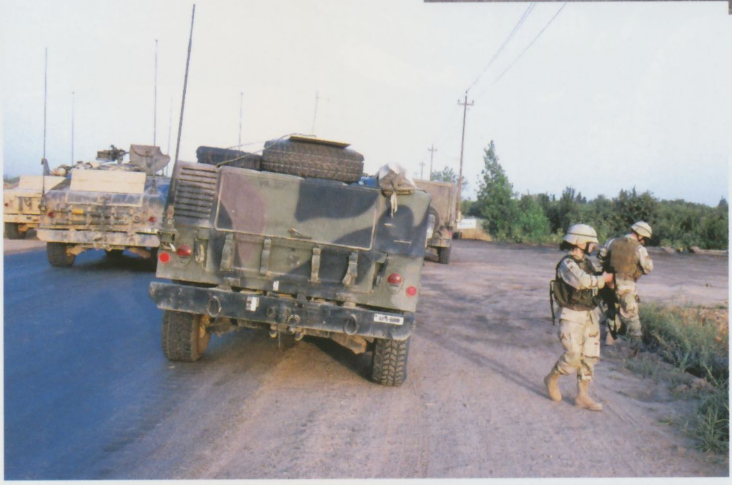




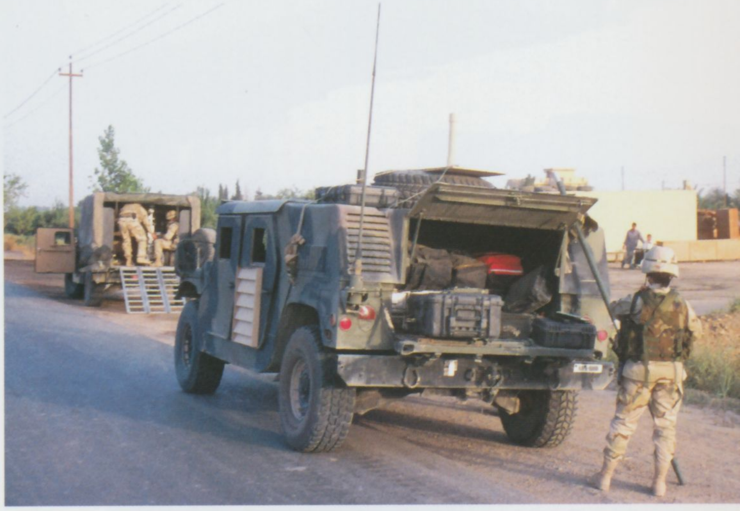
Belonging to a Special Operations Forces Psychological Operations unit, this M1114 Up-armored HMMWV has a loudspeaker system mounted on its roof. During missions such as "Knock and Search" or anti-riot missions, the loudspeaker is used to inform the local population about what is happening or to give them instructions. The vehicle was seen at LSA Anaconda in June 2004.

The USAF version of the M1114 Up-armored HMMWV is the M1116 Up-armored HMMWV. The vehicle belongs to a USAF EOD team which is on its way to disarm an IED discovered near LSA Anaconda.

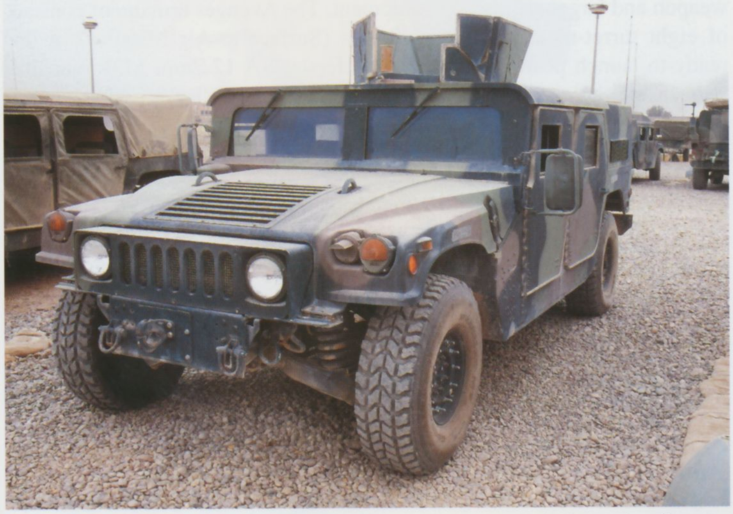




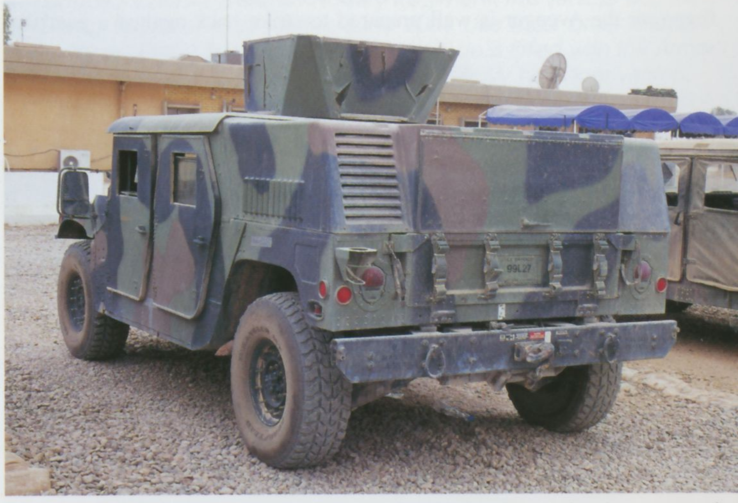
A rear view of the same M1116 Up-armored HMMWV of a USAF EOD team. Together with a soft-top and pickup version of the M1038A1 HMMWV cargo and troop carrier, the M1116 Up-armored HMMWV is used to transport all the EOD team's equipment. The specialist equipment includes EOD suits, a remote controlled EOD robot, explosives, a set of tools, electronic equipment and more.



The USAF EOD team has reached its destination and a team member prepares the kit for action. Note the open cargo tailgate of the M1116 Up-armored HMMWV.

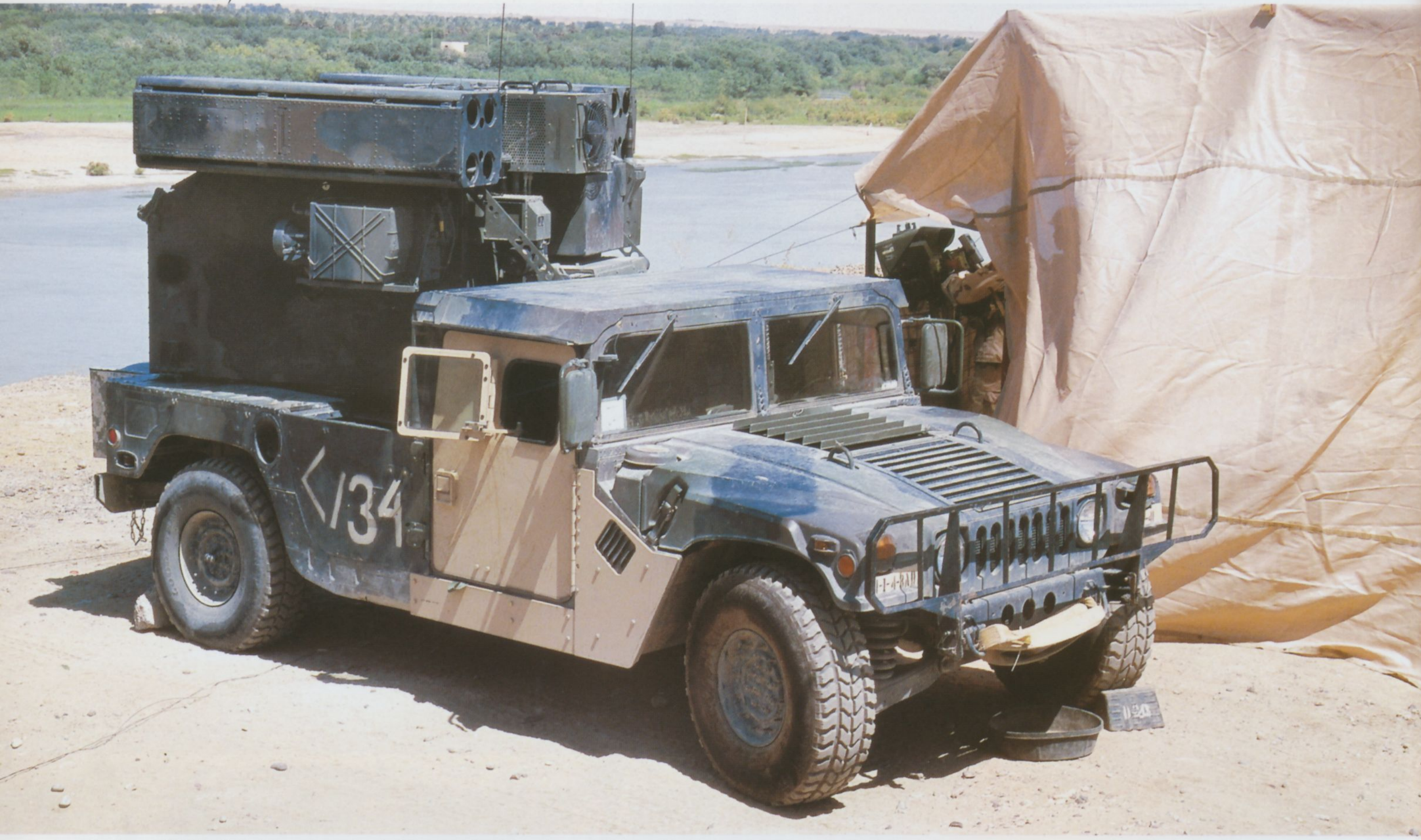


Here an M1116 can be seen with Kit A, offering 360° protection for the gunner against 7.62mm AP rounds. The pictured vehicle belongs to a USAF EOD team based at LSA Anaconda.



Rear view of the same vehicle. Note the raised rear roof compartment of the M1116 Up-armored HMMWV, which makes it easy to distinguish the vehicle from its brother, the M1114 Up-armored HMMWV.

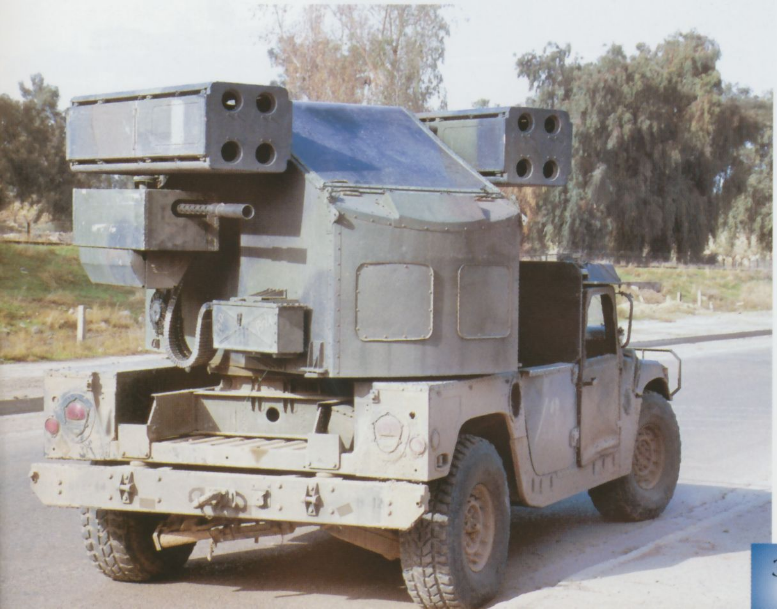
Avenger



In June 2003, this Avenger air defense missile system of the 4th Battalion, 3rd Air Defense Artillery Regiment was pictured in Tikrit. The vehicle is fitted with the two-door version of the Armor Survivability Kit (ASK). The ASK adds 900 pounds to the vehicle's combat weight.

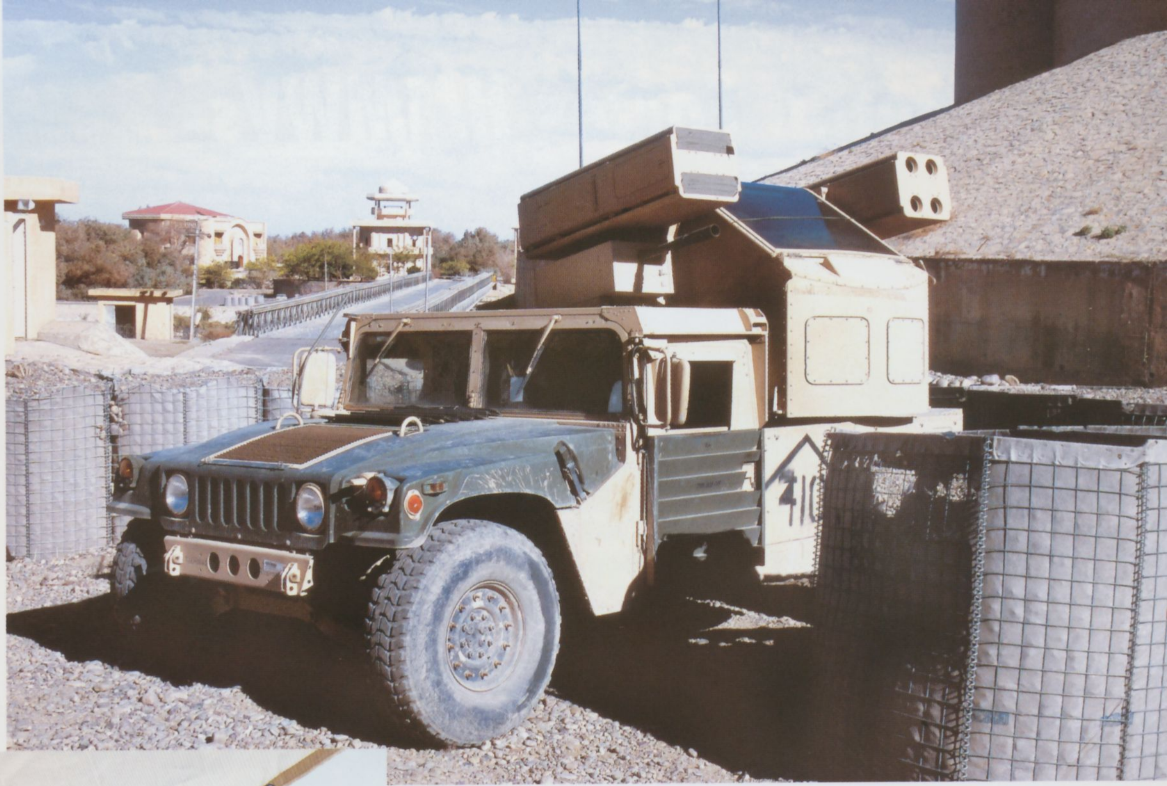
For close air defense purposes, each of the U.S. divisions deployed in Iraq has an Air Defense Artillery Battalion under its command. These battalions have two main weapon systems, the M6 Bradley "Linebacker" and the HMMWV based Avenger air defense missile system. Ever since the early phase of the conflict in March 2003, an enemy threat from the air has not existed, and therefore the air defense artillery battalions received new missions. One of these missions was to provide base security for U.S. camps in Iraq. The Avenger air defense missile system is well suited for this task, as the system includes a 12.7mm M3P machine gun which has a theoretical rate of fire of 1,100 rounds per minute. With this enormous firepower the Avenger is well prepared to strike back against a guerrilla ground attack, or likewise it can stop a vehicle packed with explosives heading for a U.S. camp or base. In total a division level air defense battalion has 36 Avengers under its command.

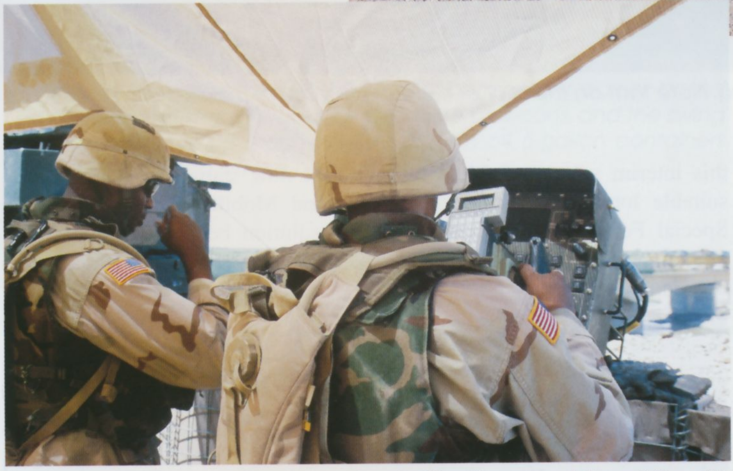
The Avenger entered service with the U.S. Army in November 1988, and saw its combat debut in 1991 during the Gulf War. In total, the U.S. Army received 1,779 Avenger air defense missile systems. The Avenger is based on the M1037 HMMWV Shelter Carrier. The Avenger turret is mounted in the cargo bed of an M1037 HMMWV by the use of a framework of C-shaped steel struts. The turret contains the vehicle's weapon and target acquisition equipment. The Avenger armament consists of eight turret-mounted Stinger SAMs (Surface-to-Air Missiles) in the ready-to-launch position, and the FN Herstal SA 12.7mm M3P machine gun. Inside the electrically powered turret, the AN/VRC 91 SINCGARS radio and the AN/VIC 1 intercom system are placed alongside the hi-tech apparatus of the Stinger IFF AN/PPX3B interrogator, CAI optical sight, Magnavox FLIR, DBA automatic video tracker and Texas Instruments CO_ eye-safe laser rangefinder. By the use of a Remote Control Unit (RCU) the Avenger's weapons can be operated from a position up to 50 meters away from the vehicle. The M1037 HMMWV vehicle cab is fitted with an armored roof and the doors of the armament carrier have basic armor. By summer 2004, most of the Avengers deployed to Iraq were fitted with the ASK



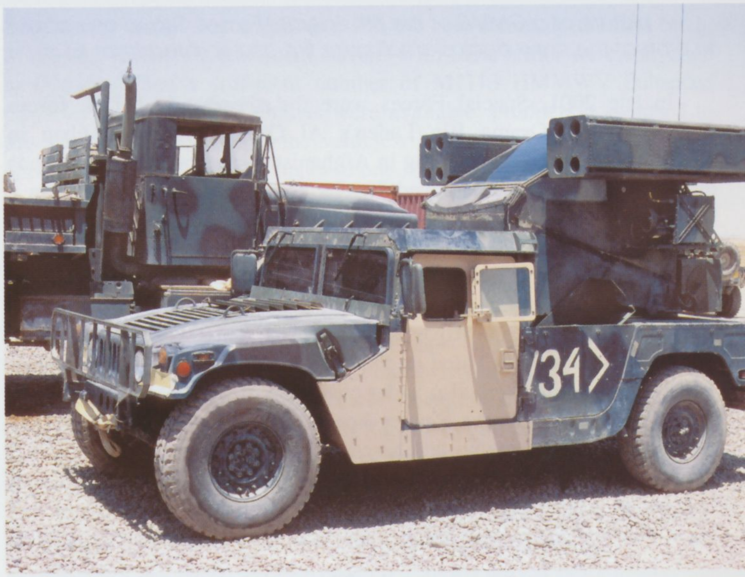
This Avenger air defense missile system of the 2nd Battalion, 44th Air Defense Artillery Regiment of the 101st (U.S.) Airborne Division, was seen on the streets of Mosul in November 2003. The "Screaming Eagles" used their Avenger air defense missile systems to provide additional fire power for their combat patrols. It was a common sight to see a patrol operating in the streets of Mosul being followed by an Avenger air defense missile system.

An Avenger air defense missile system of the 1st Battalion, 44th Air Defense Artillery Regiment of the 4th (U.S.) Infantry Division ("Ivy Division"), provides security for the Division HQ in Tikrit. The vehicle was seen in Saddam Hussein's former palace in Tikrit in December 2003.

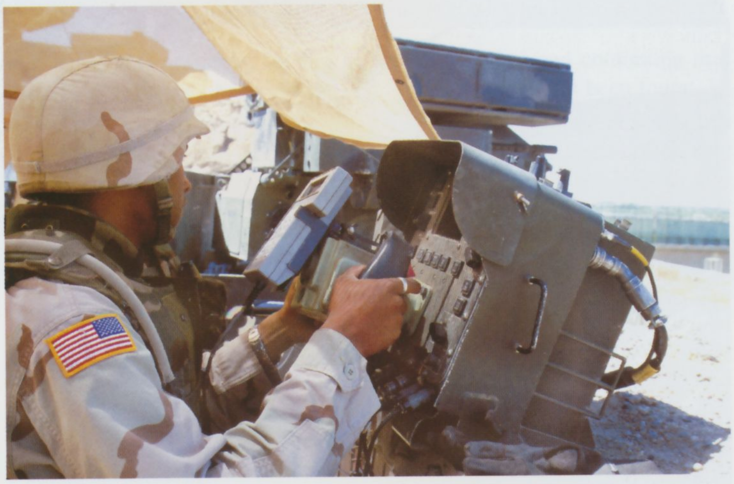


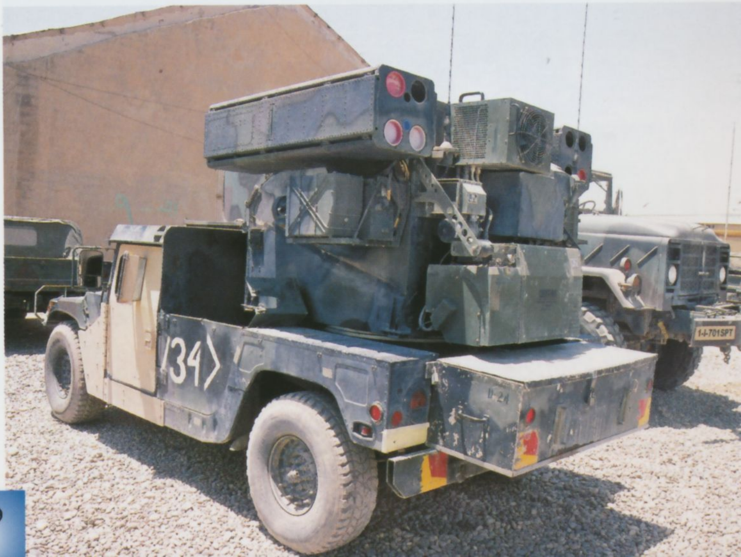


From behind a HESCO bastion fortification, a soldier of the 4th Battalion, 3rd Air Defense Artillery Regiment, operates an Avenger air defense missile system by way of the remote control unit. This picture was taken in Tikrit, and in the background one of the bridges across the Tigris River can be seen. The bridge is well in range of the Avenger's 12.7mm M3P machine gun.



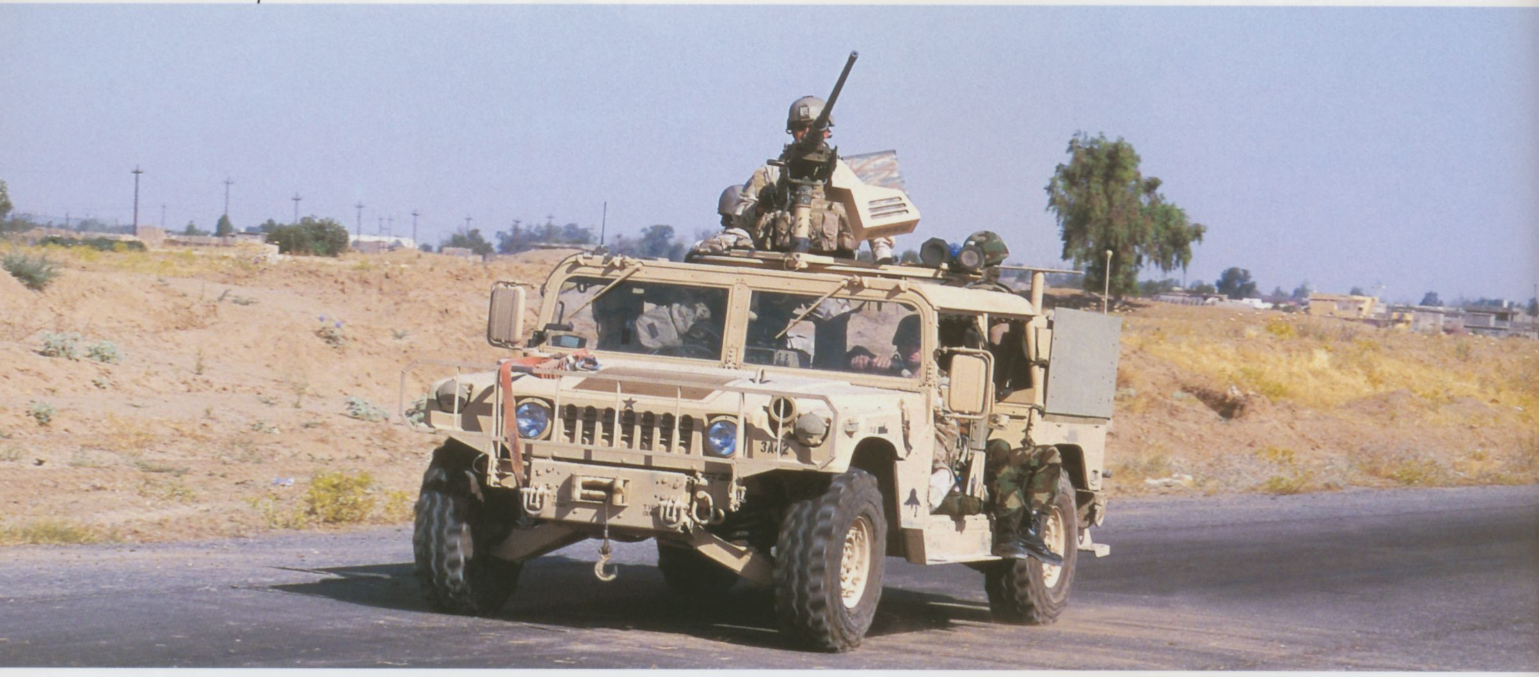
Another picture of an Avenger air defense missile system of the 4th Battalion, 3rd Air Defense Artillery Regiment. This vehicle was seen at Camp Speicher near Tikrit in June 2004. Like most other HMMWV variants used by U.S. troops in Iraq, the vehicle is fitted with the Armor Survivability Kit, in this case the 900 pound heavy two-door version.





Rear view of an Avenger air defense missile system of the 4th Battalion, 3rd Air Defense Artillery Regiment of the 1st (U.S.) Infantry Division. The vehicle was seen at Camp Speicher near Tikrit in June 2004.

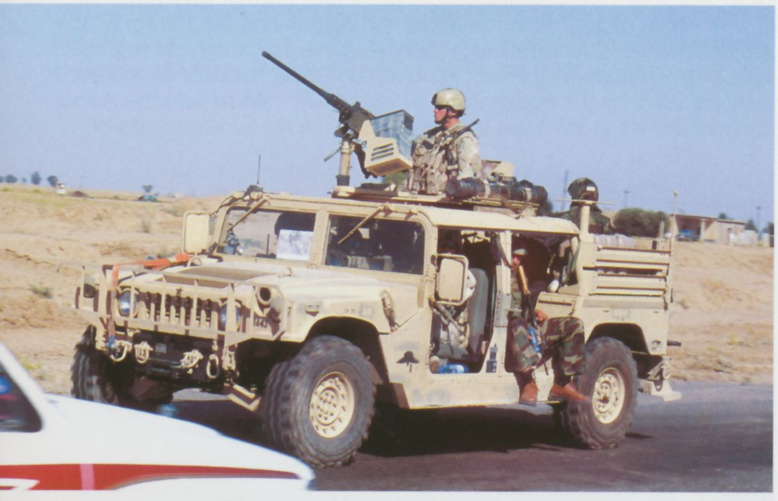
U.S. Special Forces HMMWVs– The Ground Mobility Vehicle



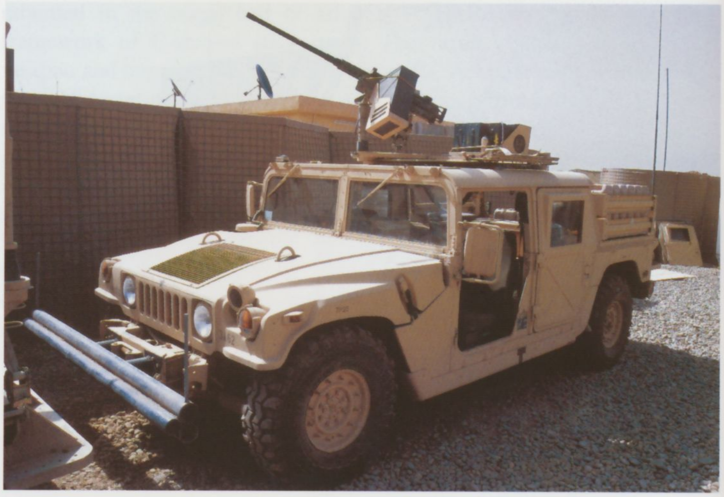
A picture of a GMV-S of the 5th Special Forces Group on patrol in Iraq. Note that on the rear of the vehicle, armored plates are fitted so as to protect the crew against small arms fire and splinters from IEDs.

In late 2001, Special Forces were the spearhead of U.S. forces fighting against Osama Bin Laden's Al Qaeda and the Taliban in Afghanistan. During the fighting in Afghanistan, it soon became obvious that the A-Teams of the deployed Special Forces had a requirement for a highly mobile, air transportable, cross-country vehicle with a high payload. In order to fill this gap in the Special Forces inventory, a large quantity of Toyota pickup trucks were immediately purchased in Tennessee by Special Operations Command (SOCOM). In addition to this, a couple of British Land Rover Defender 110 vehicles were purchased. The latter purchase was based on the experiences of U.S. Army Rangers. The Rangers, which were also under command of SOCOM, were already using Land Rovers in the Ranger Special Operations Vehicle (RSOV) configuration. The newly purchased vehicles were modified by L3 Communications Integrated Systems in Lexington, Kentucky, and then sent out to Afghanistan. The modifications included the fitting of roll cages, machine gun mounts and storage racks for ammunition boxes. With this interim solution fielded, the SOCOM now started to search for a suitable long-term solution for a "Ground Mobility Vehicle" for the Special Forces A-Teams. When such a solution became available and operational, it was also to become the workhorse for the Special Forces operating in Iraq.

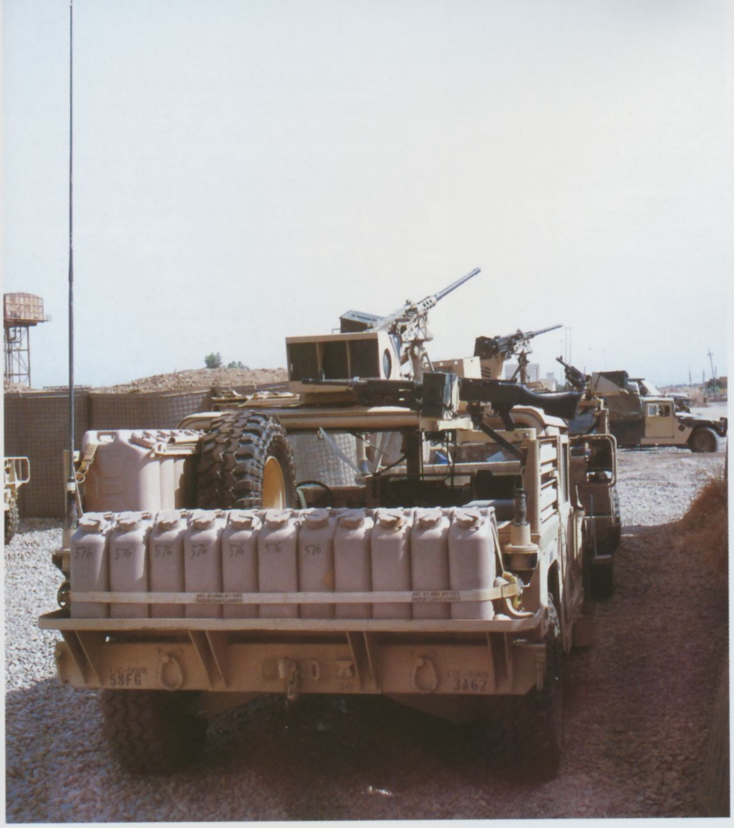
In the early stages of war in Iraq, U.S. Special Forces conducted offensive operations behind Iraqi lines against key targets such as airfields, long-range artillery positions, headquarters, communication facilities, ammunition and supply storage sites, and air defense positions. Additionally, U.S. Special Forces supported Kurdish forces in northern Iraq in order to create a northern front against Saddam Hussein's army. Another mission for the U.S. Special Forces was the search for weapons of mass destruction. After the initial attack on Iraq had finished, the mission of the U.S. Special Forces evolved, and since then the elite soldiers of the U.S. forces were kept busy training units of the new Iraqi



Iraq, June 2004, an M1025A2 HMMWV armament carrier based GMV-S of the 5th Special Forces Group is on patrol somewhere in Iraq. On the roof of the vehicle, a .50-cal M2A2 HB machine gun is mounted. Note that the vehicle is prepared for quick recovery, with a tow rope already attached to a recovery attachment point of the vehicle.



This early M1025A2 HMMWV armament carrier based GMV-S of the 5th Special Forces Group is fitted with the three inch lower Low Profile A-Frame weapon mount. It can here be seen fitted with a M2 HB machine gun. Note the special front bumper consisting of welded steel pipes. The vehicle is fitted with the basic armored doors of the HMMWV armament carriers.

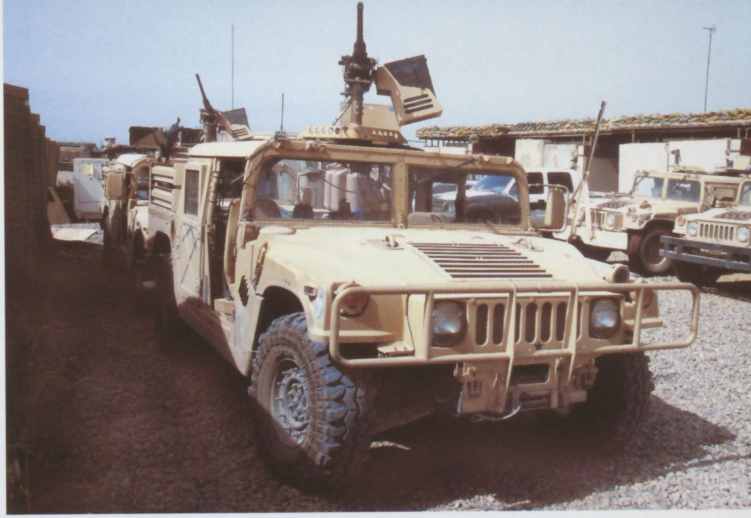


A rear view of an M1025A2 HMMWV armament carrier based GMV-S. Note the storage racks for fuel and water cans, and the swing arm mounted M240B machine gun. In total, 64 5-gallon containers can be transported on the back of the GMV-S.

Armed Forces, searching for former regime loyalists and continuing the search for weapons of mass destruction which still had not been found. It is hard to say exactly which Special Forces units have been deployed to Iraq since the outbreak of hostilities in March 2003. However, it is certain that they deployed under the command of Special Operations Command Central (SOCCENT), which is part of CENTCOM (U.S. Central Command). It is estimated that some 2,500 Special Forces members were operating in Iraq in the summer of 2004, but in earlier combat, many more were deployed.

GMV development

Right from the beginning when the U.S. Army employed High Mobility Multipurpose Wheeled Vehicles in 1983, the same vehicle was expected by SOCOM to match its own needs. Due to its cross-country mobility, durability and high payload, the HMMWV was considered a perfect solution. But SOCOM was looking for a vehicle with unique capabilities above and beyond those provided by the standard army HMMWV. SOCOM wanted increased lethality, survivability and sustainability, and due to ongoing operations in Afghanistan and the upcoming Iraq conflict, the vehicle was needed as soon as possible. In a civilian market survey, the Military Systems Group Incorporated (MSG) in Nashville, Tennessee, was finally selected to deliver the majority of parts needed for upgrading the HMMWVs into Ground Mobility Vehicles (GMV). MSG has for years been involved in the design and production of machine gun mounts and other tactical vehicle equipment. AM General, the manufacturer of the HMMWV, announced at very short notice that it was not able to produce the GMV. Therefore, SOCOM decided to task the Letterkenny Army Depot (LEAD) with the conversion. In the first batch, M1025A2 HMMWV armament carriers with basic armor were converted to GMVs. When a sufficient number of M1113 HMMWV Enhanced Capacity Vehicle (ECV) chassis were available, production switched to this heavier chassis due to the vehicle's higher payload of 2,318kg, as opposed to 1,996kg for the standard one.



Front view of an M1113 HMMWV based GMV-S of the 5th Special Forces Group. The vehicle is fitted with the basic armored door of the early HMMWV armament carrier series. The vehicle is armed with a 12.7mm M2A2 HB machine gun.

Furthermore, the ECV had a more powerful engine than the M1025A2 HMMWV. At the time of writing, LEAD had converted over 500 HMMWVs into GMVs. Currently the GMV is used by SOCOM units in the following variants:

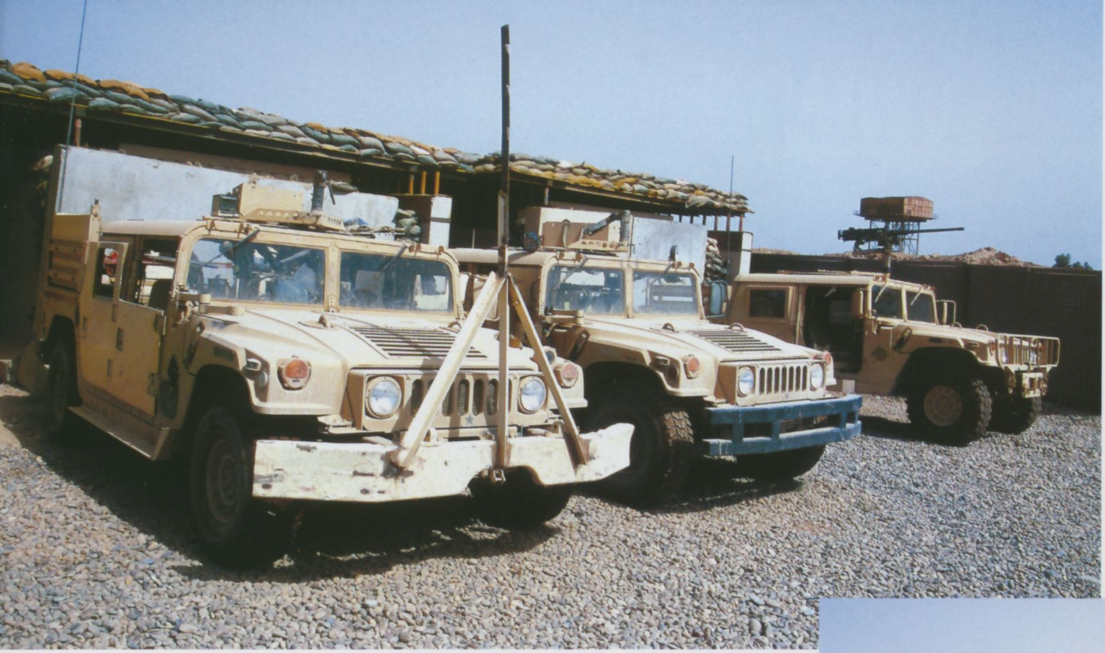
- GMV-S, Ground Mobility Vehicle – Special Forces: In use with the 3rd, 5th, 10th and 19th Special Forces Group.
- GMV-R, Ground Mobility Vehicle – Rangers: In use with the 1st, 2nd and 3rd Battalions of the 75th Ranger Regiment. The Rangers also use the Land Rover Ranger Special Operations Vehicle (RSOV).
- GMV-N, Ground Mobility Vehicle – Navy SEALs: In use with SEAL Teams 1, 3, and 5 of the Naval Special Warfare Group 1, and SEAL Teams 2, 4 and 8 of the Naval Special Warfare Group 2.

The U.S. Air Force has also ordered a couple of GMVs for units of the U.S. Air Force Special Operations Command.

GMV capabilities and technical details

The GMV provides the Special Forces with a capability to deploy and operate behind enemy lines for a period of up to 10 days without any external support. The GMV can be airlifted inside U.S. transport aircraft such as the C-17 Globemaster III or the C-130 Hercules. The MH-47L Chinook and MH-60L Blackhawk helicopters of the 160th Special Operations Aviation Regiment can also deliver the GMV into an operational area. However, this can only be done as an underslung load, due to the vehicle's dimensions. The 190hp 8-cylinder 6.5litre turbo diesel engine allows the GMV to reach a top speed of 88km/h. With 95 litres of fuel in its tank, the GMV can cover a distance of 442km. For its transmission the GMV uses the Turbo Hydra-Matic 4L80-E automatic transmission, with four forward and one reverse gear. The reinforced steel frame of the M1113 HMMWV ECV chassis, together with its suspension consisting of an independent double A frame with open end coil springs and hydraulic shock absorbers, provides the GMV with an outstanding cross-country capability and a ground clearance of 39cm.

The driver of the GMV sits on the left, and on his right the commander is situated in the passenger seat. In the rear of the vehicle a

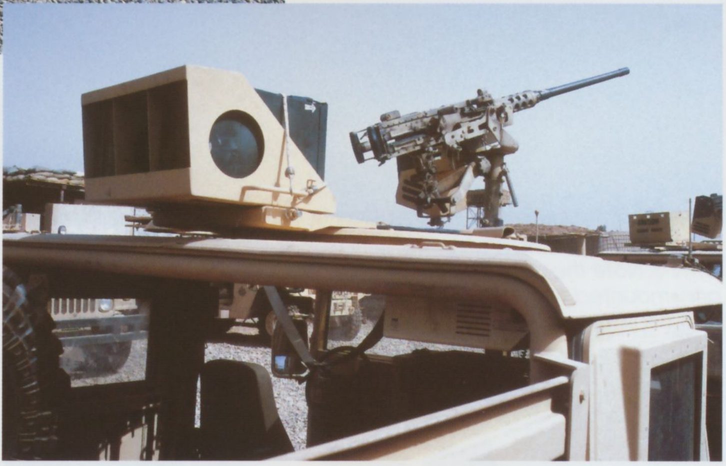


Here GMV-S vehicles can be seen parked in the lot of an A-Team operational base of the 5th Special Forces Group. Note the large front bumpers on the first two vehicles that were fitted at the unit level, as well as the front-mounted vertical wire cutter and armored doors on the first vehicle. The two GMV-S vehicles nearest the camera are based on the M1113 HMMWV ECV. The farthest vehicle is an earlier M1025A2 HMMWV based GMV-S.

gunner is situated. Next to the commander, on the right side of the vehicle, a machine gun swing arm mount is positioned. A similar mount is placed at the right rear corner of the vehicle. On both mounts, various weapons such as the 7.62mm M240B or the 5.56mm M249 SAW machine guns, or the .50-cal M82A1 "Light Fifty" heavy sniper rifle can be mounted. In order to mount the machine gun in the commander's position, the M1113 HMMWV ECV's air intake had to be modified. A ring mount with a 360° traverse is situated in the center of the GMV's roof. This mount can be fitted with the .50-cal M2 HB machine gun or the Mk.19 Mod. 3 automatic grenade launcher, or alternatively the lighter 7.62mm M240B or 5.56mm M249 SAW machine guns. GMVs that were manufactured later received a Low Profile A-Frame weapon mount that was three inches lower, this modification allowing the GMV to be loaded into an MH-47L helicopter. On the roof ring opposite the gun mount there is an ammunition box storage rack fitted. Here boxes with up to 225 .50-cal rounds, or boxes containing 32 40mm rounds can be stored. As well as this, the Special Forces use the roof to carry AT-4 or Javelin antitank weapons which are simply strapped to the roll cage.

The communication kit used on the GMV can be adapted according to the mission requirements. A typical combination might be two SINCGARS radios, an AN/PRC 117F radio and the Gentex crew communication system. Two vehicles in an A Team will also carry a SATCOM system. For information management and secure information transmitting, the GMV is fitted with the FBCB 2 "Blue Force Tracker" command, control and data management system. The FBCB 2 is connected to an AN/PSN-11 PLGR navigation system, which allows the vehicle crew at any time to know its current location. A Power Inverter Kit converts 24 VDC to 120 VAC, 60 HZ, providing a pure sine waveform. The Inverter has a controlled frequency of 60 HZ, plus or minus 0.6 HZ with 300 W output through 2 three-pin outlets. The Inverter is protected from rain by a splash-proof cover and is mounted on an interface plate attached to the HMMWV vehicle roof.

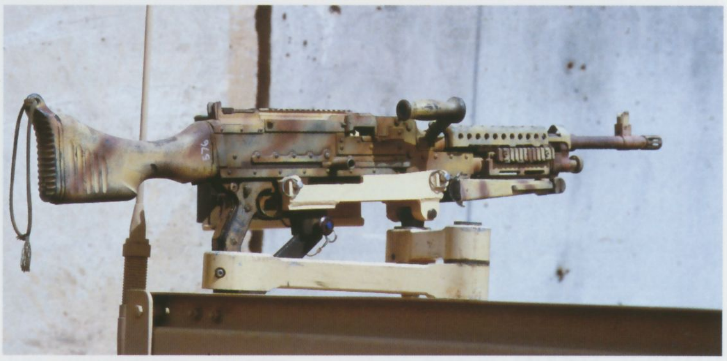
On the front of the GMV there is a brush guard fitted, so therefore the vehicle's hood mounting had to be modified in order to allow it to be opened without removing the brush guard. Storage racks mounted in the GMV's cargo bed and on the rear of the vehicle allow the crew to carry water and fuel supplies of up to 64 5-gallon cans. In the same areas up to four spare wheels and additional ammunition can be carried. In order to accept a higher load the cargo bed has been modified with reinforced body panels. Similar panels were also placed under the vehicle's main frame in order to prevent damage when robust recovery techniques are used, or high lift jacks are operated. For easier recovery, each vehicle is fitted with a winch and a Pull-Pal self-recovery system. After the standard Goodyear tires in Afghanistan proved unsuitable for Special Forces, the GMVs were fitted with Super Swamper TSL SX 36x12.5x16.5 tires.



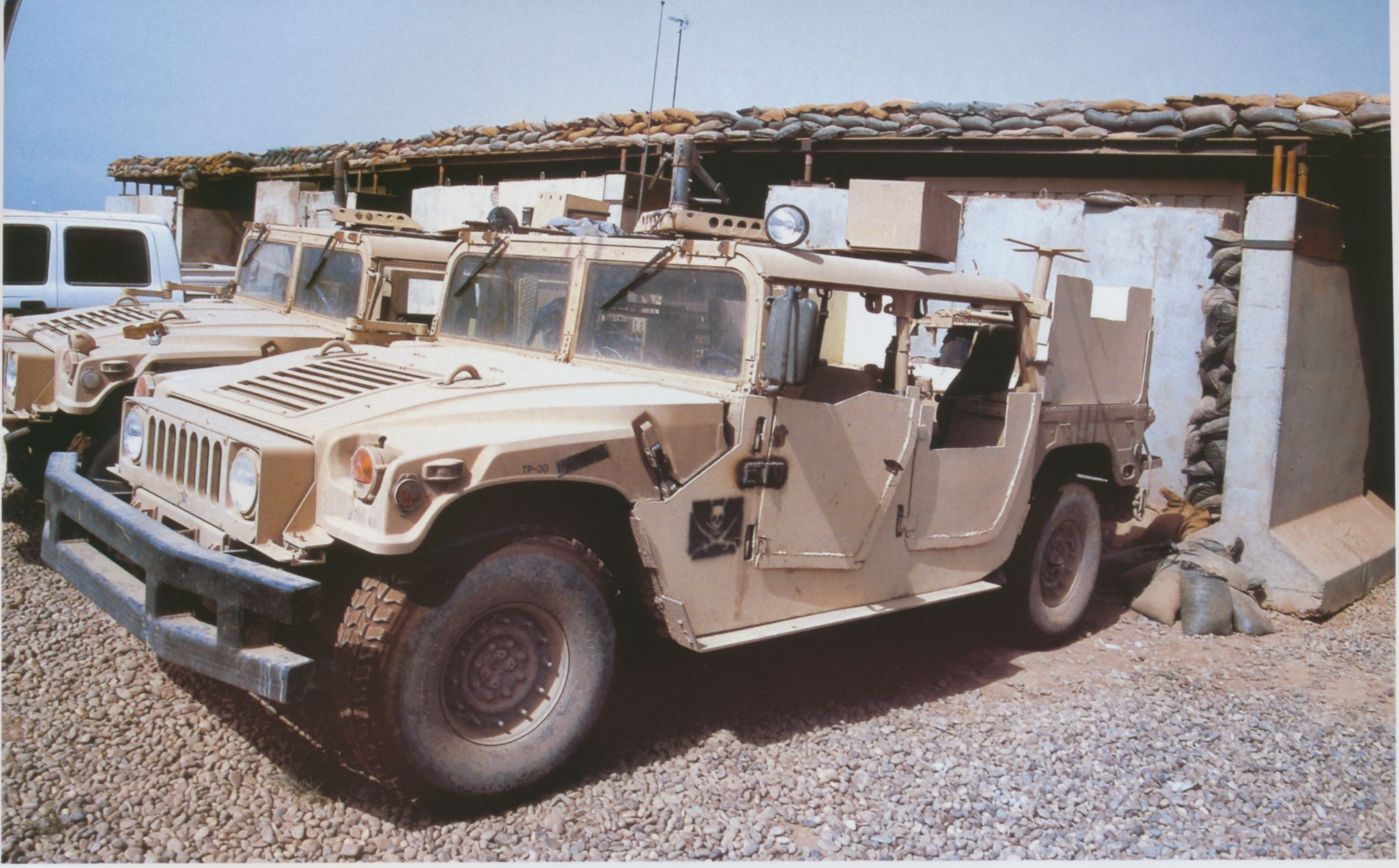
An ammunition box storage rack is situated on the roof ring of the GMV-S opposite the gun mount.

Operational modifications

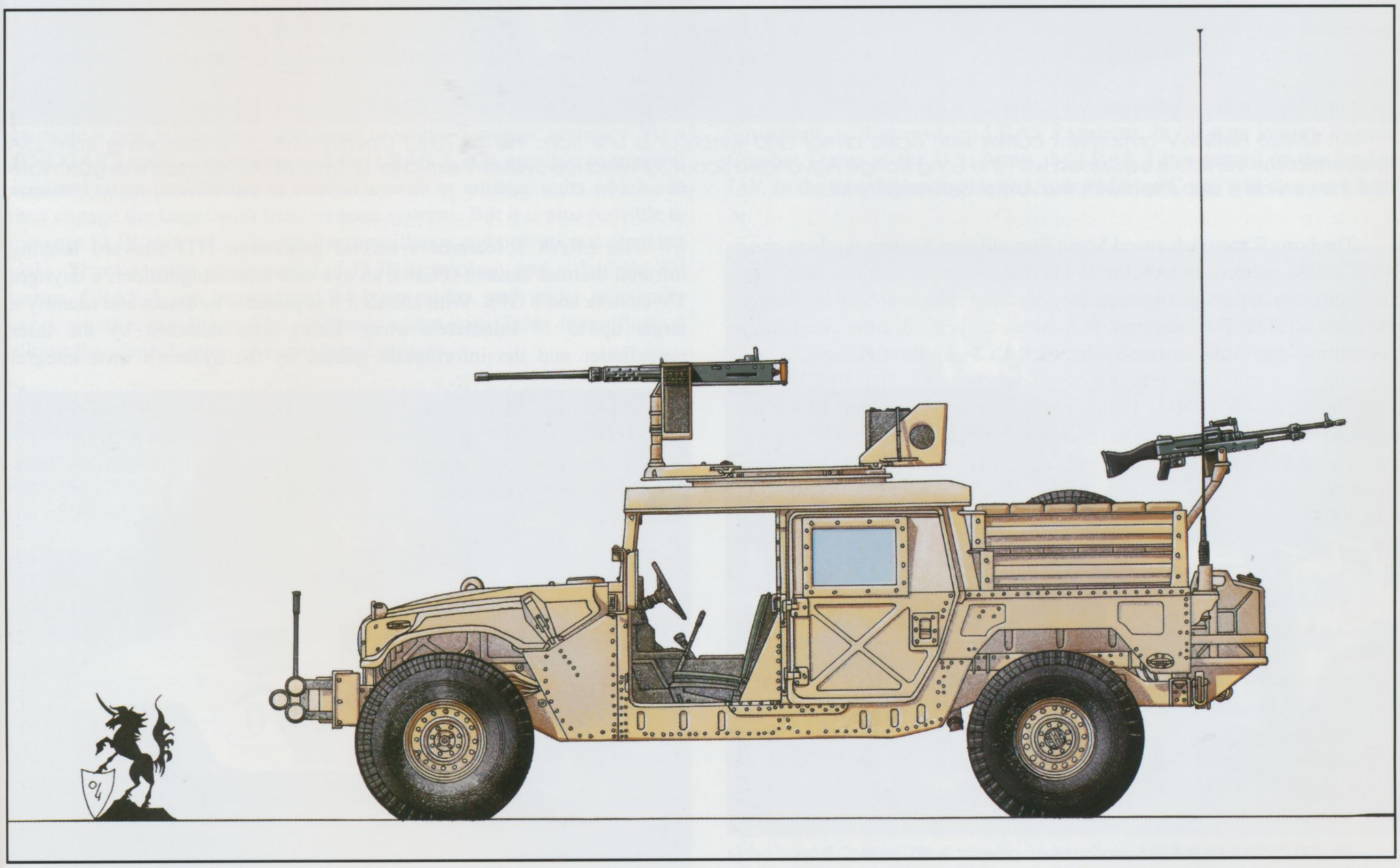
Basically it can be said that in the case of the GMV, anything is possible. During operations the Special Forces crews usually modify the vehicles to suit their needs. This might mean that the machine gun swing arm mount is moved around to different positions. In such cases it is mounted with different types of brackets. Although delivered without doors, Special Forces vehicles in Afghanistan were seen fitted with standard M1025 HMMWV armament carrier doors. These doors only provide limited protection from the effect of IEDs, artillery fragments and small arms bullets. The basic armored doors are made of a combination of steel and Kevlar, while layered polycarbonate windows are designed to stop a fragment weighing 17 grains. In Iraq GMVs were seen fitted with armored doors fitted at the unit level, massive front bumpers and wire cutters mounted on the front.



Here a 7.62mm M240B machine gun can be seen mounted on the swing arm weapons mount. The mount can be fitted in various positions on the GMV, including a position close to the front passenger seat.

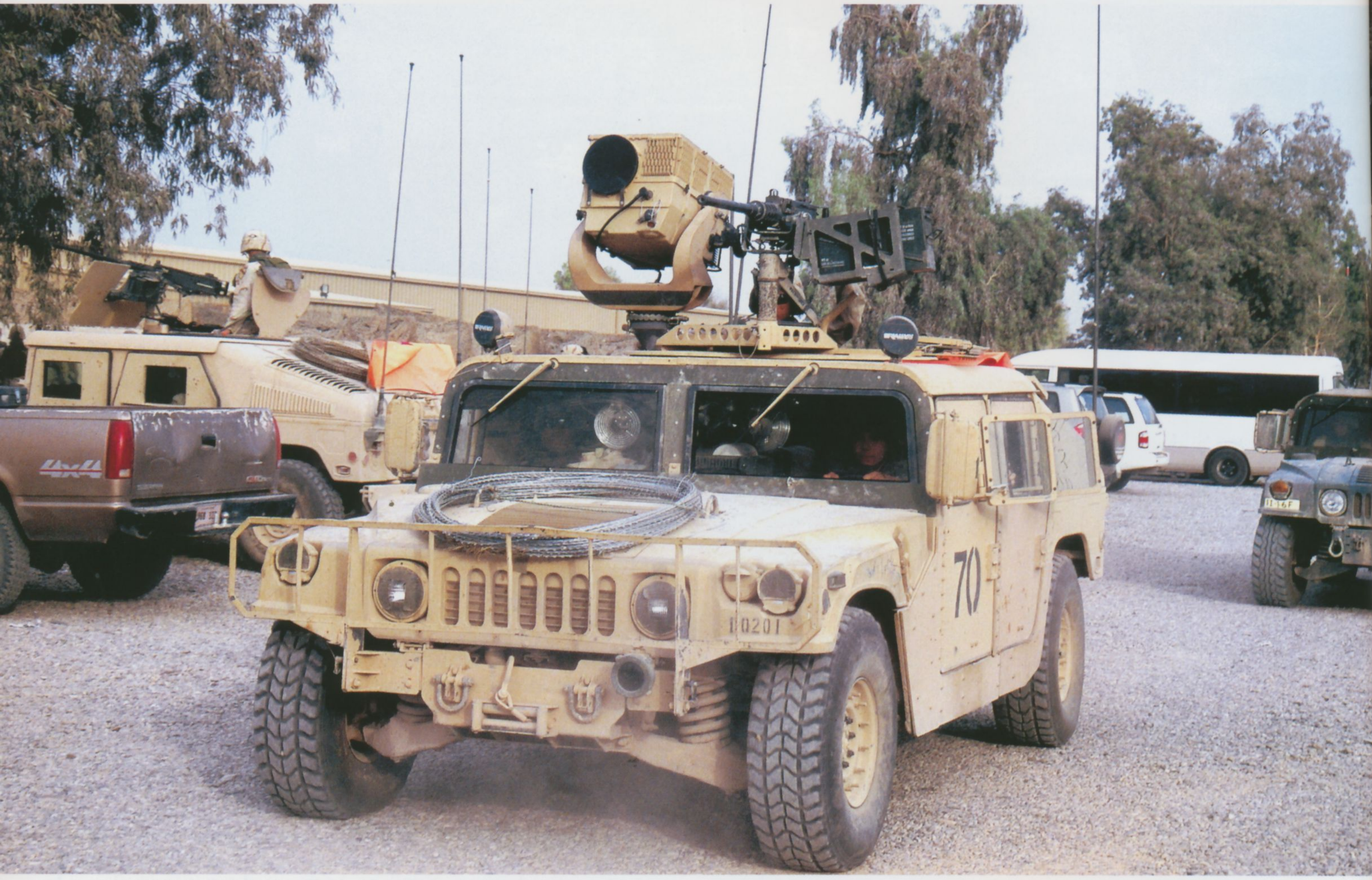


This GMV-S is based on the M1113 HMMWV ECV and was operated by the 5th Special Forces Group in Iraq when the unit was deployed there in the summer of 2004. Note that the vehicle is fitted with an add-on armor kit made at the unit level. Another notable feature is the vehicle's running boards which contribute to easier mounting and dismounting from the vehicle.



This drawing shows a Ground Mobility Vehicle-Special Forces in use with the 5th Special Forces Group in Iraq. The vehicle is an early GMV-S, based on the M1025A2 HMMWV armament carrier with basic armor. To the rear of the vehicle, a special rack is mounted to store fuel and water containers. Other visible modifications are the roof-mounted Low Profile A-Frame weapon mount, the swing arm weapons mount in the cargo bay and a unit made front bumper made of steel pipes.

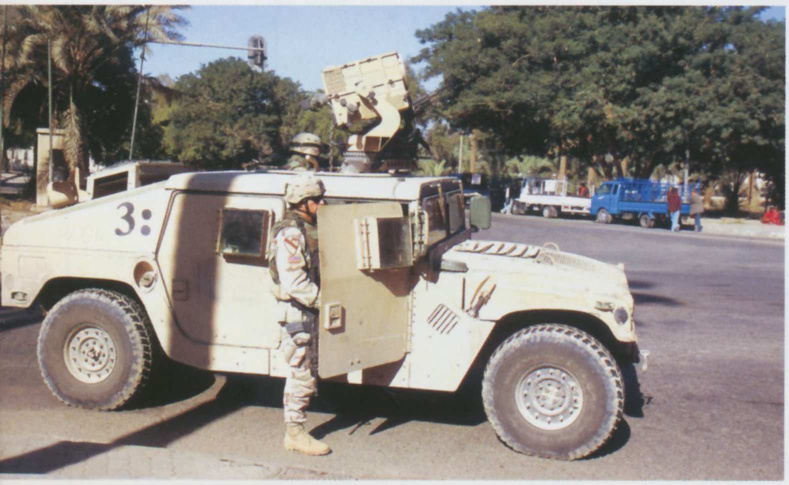
HMMWVs with LRAS 3



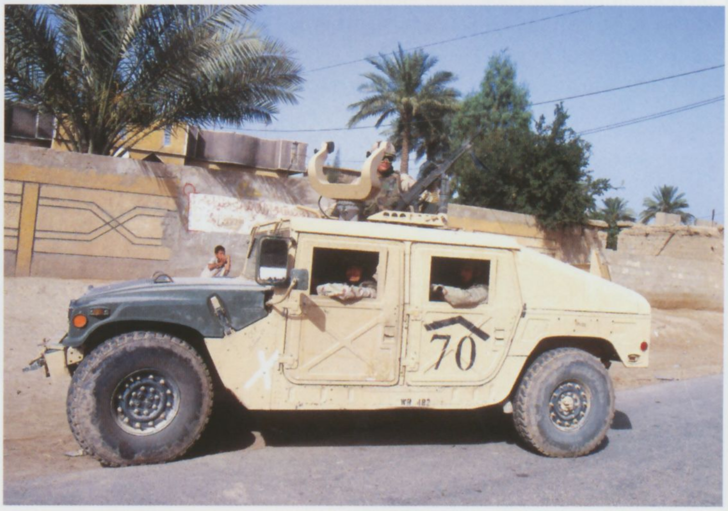
An M1026 HMMWV armament carrier with basic armor and winch of a unit from the 1st (U.S.) Cavalry Division, is departing from LSA Anaconda. The vehicle is equipped with the Long Range Advanced Scout Surveillance System next to its 12.7mm M2A2 HB machine gun. Note that the vehicle is also fitted with the Armor Survivability Kit.

The Long Range Advanced Scout Surveillance System is a long-range multi-sensor system which provides the operator with a real time capability to detect, recognize, identify and pinpoint distant targets. Mounted on HMMWVs in Iraq, U.S. Army units fielded the Long Range Advanced Scout Surveillance System (LRAS 3) for the first time.

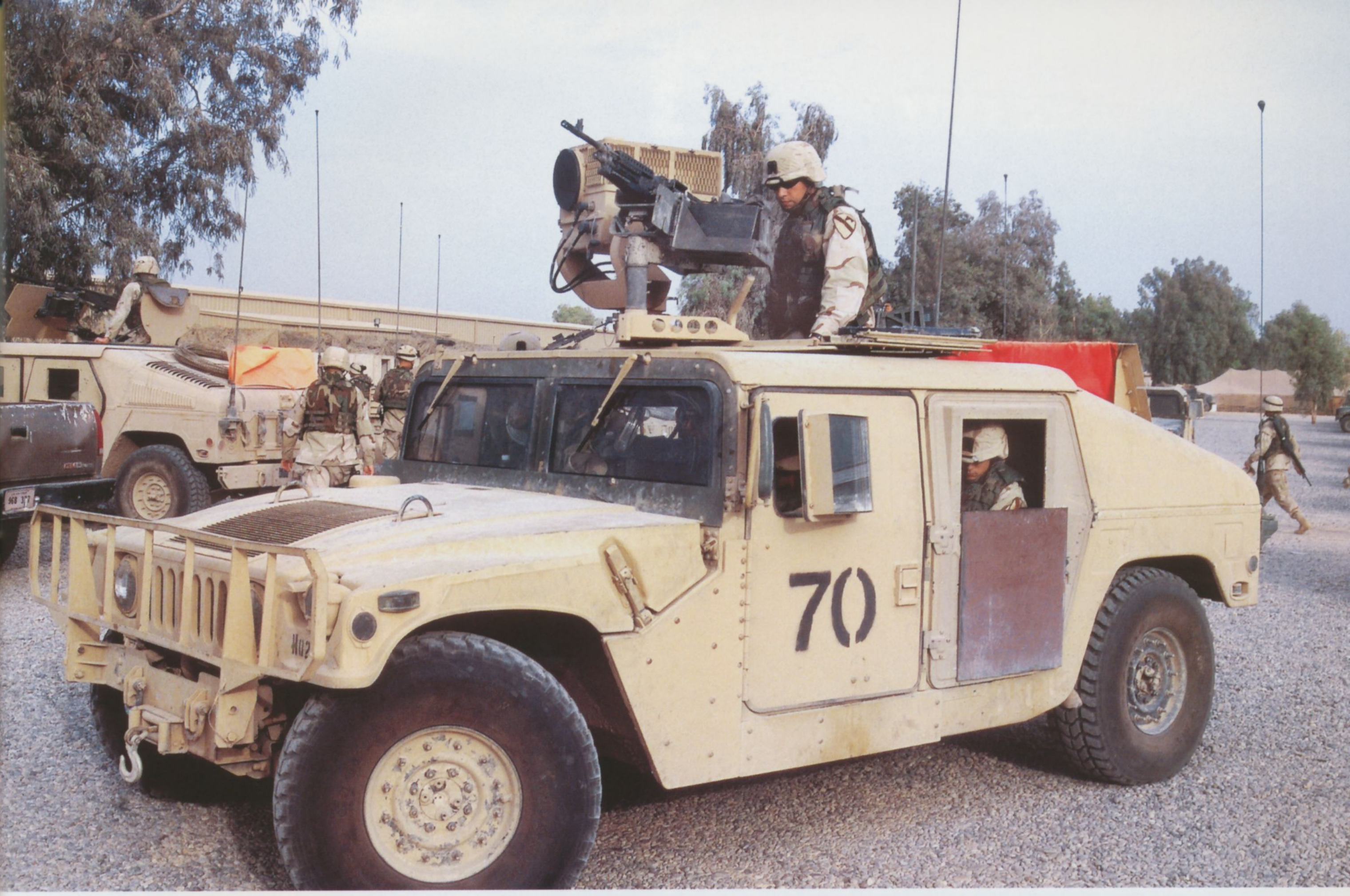
The LRAS 3 features a second generation HTI forward looking infrared thermal camera (FLIR), an eye-safe laser rangefinder, a daylight TV camera and a GPS. With LRAS 3 it is possible to detect and identify a target up to 15 kilometers away. Using data detected by the laser rangefinder and the information gained by the system's own integral



An M1025A1 HMMWV armament carrier with basic armor, of D Troop, 9th Cavalry Regiment, on patrol in Baghdad's "Green Zone" in November 2004. The vehicle is fitted with the ASK and a Red Dot Corporation air-conditioning system. The LRAS 3 is fitted to all vehicles of the reconnaissance units at the brigade level.



This M1025 HMMWV armament carrier with basic armor belongs to the 1st Battalion, 77th Armor Regiment, and is fitted with the mount for the LRAS 3 long-range multi-sensor detection system. The vehicle was seen on patrol near Balad in June 2004.

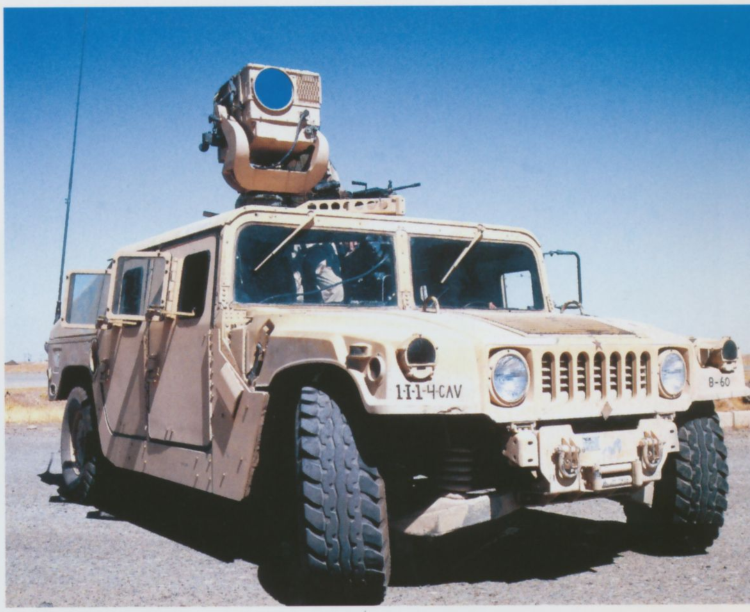


An M1026 HMMWV armament carrier with basic armor and winch, of a scout unit of the 1st (U.S.) Cavalry Division. Note the mix of doors, as the driver's door is one of the Armor Survivability Kit examples, while the rear door is the original basic armor door which has been fitted with a steel plate to provide additional protection for the crew.

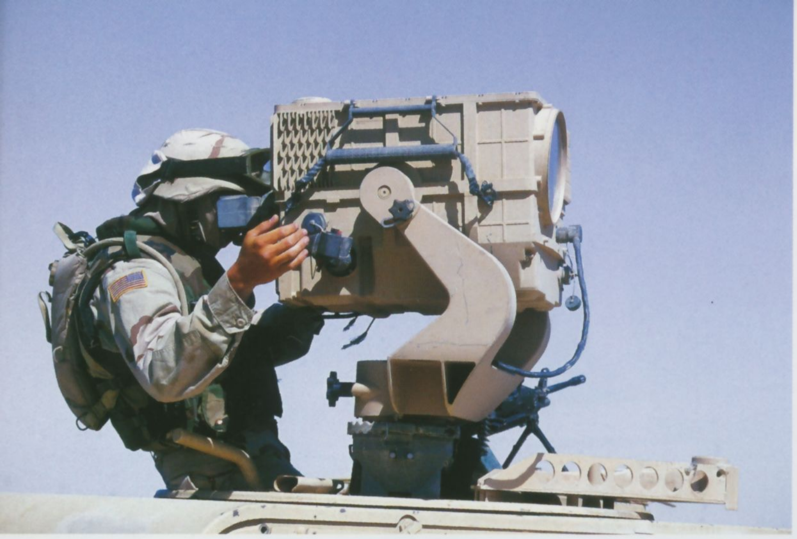
global positioning interferometer, the LRAS 3 processor unit is able to generate a grid reference for the target to within 5 meters' accuracy. Via a SINCGARS radio connection with the LRAS 3, it is possible to transmit acquired target coordinates to combat aircraft or artillery units which can then engage the target with their weapon systems. But it is also possible to transmit FLIR and video images for surveillance and operational planning tasks. Thanks to the combination of FLIR technology and a daylight TV sensor, LRAS 3 can be operated 24 hours a day, and under practically every weather condition. The electronic zoom with 2x/4x magnification allows the identification of even distant objects.

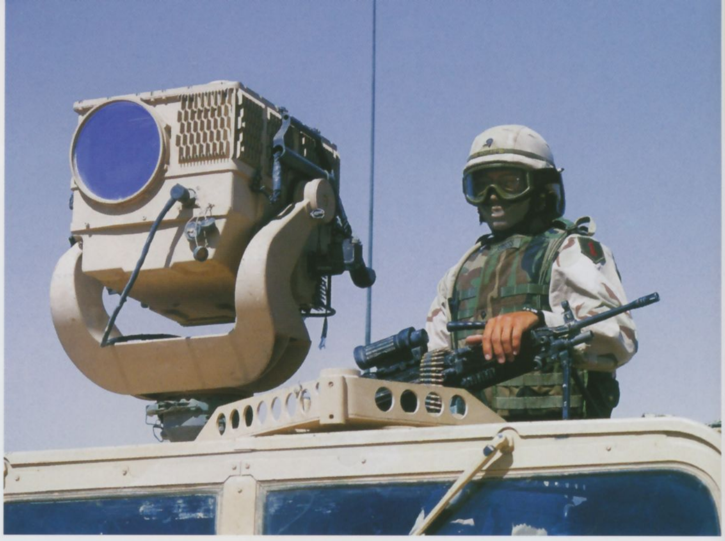
Use within reconnaissance units and scout platoons

The LRAS 3 is used within the Scout Platoons of the mechanized and armor battalions as well as in the Cavalry units of the U.S. Army. In these units the LRAS 3 is mounted on HMMWVs. Current plans will see three out of the ten M1114 HMMWVs in a Scout Platoon fitted with the LRAS 3 system. Battalion-sized armored reconnaissance units, called Cavalry Squadrons, will receive ten LRAS 3 systems. In the new Interim Brigade Combat Teams of the U.S. Army, the LRAS 3 is mounted on the Stryker IAV. In the near future the United States Marine Corps will also get LRAS 3.



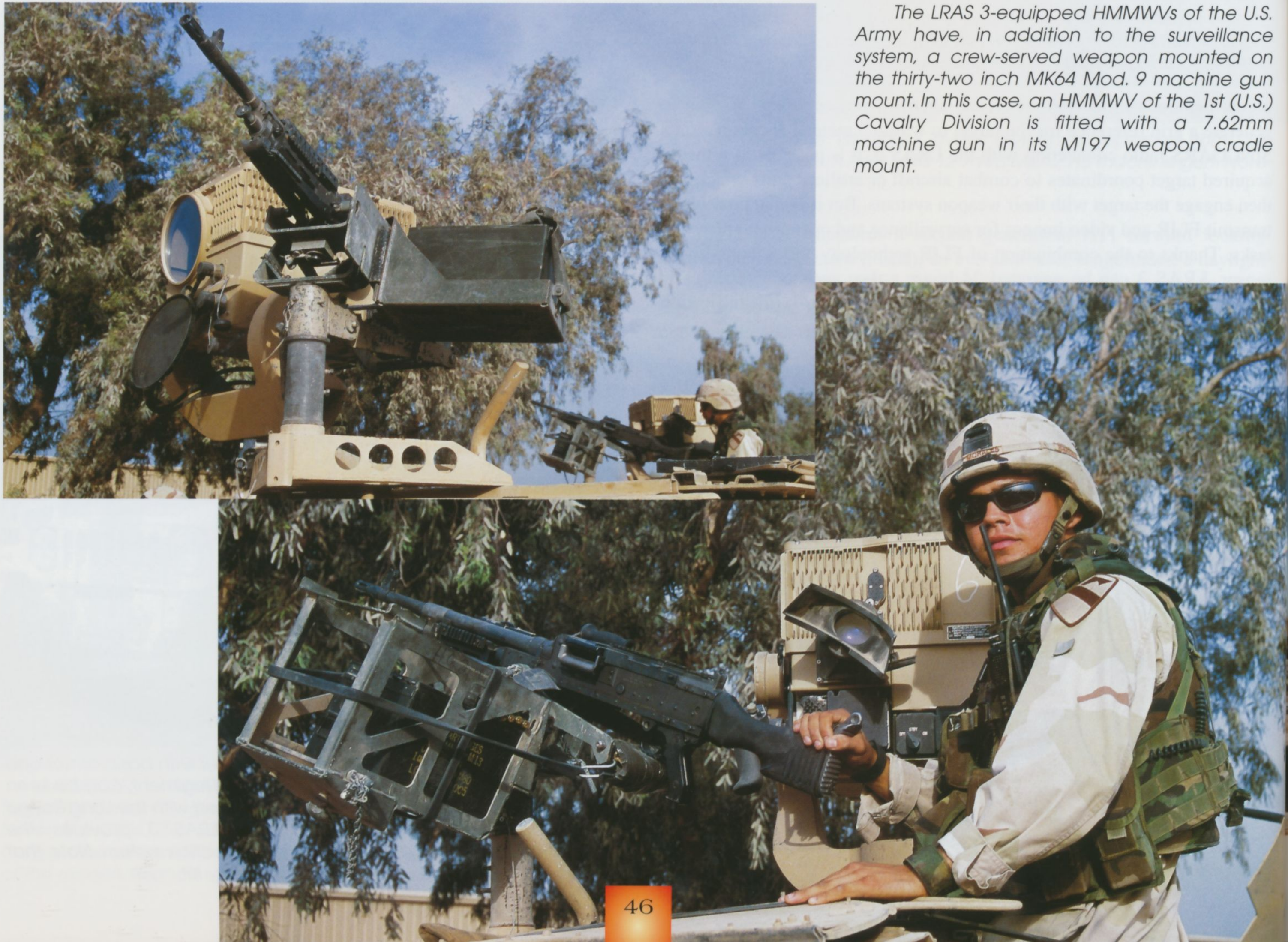
Here an M1026 HMMWV armament carrier with basic armor and winch of B Troop, 1st Squadron, 4th Cavalry Regiment, can be seen during a patrol north of Bayji. The vehicle is fitted with the Long Range Advanced Scout Surveillance System. LRAS 3 provides the reconnaissance units with a long-range detection system. Note that the vehicle is fitted with the Armor Survivability Kit.





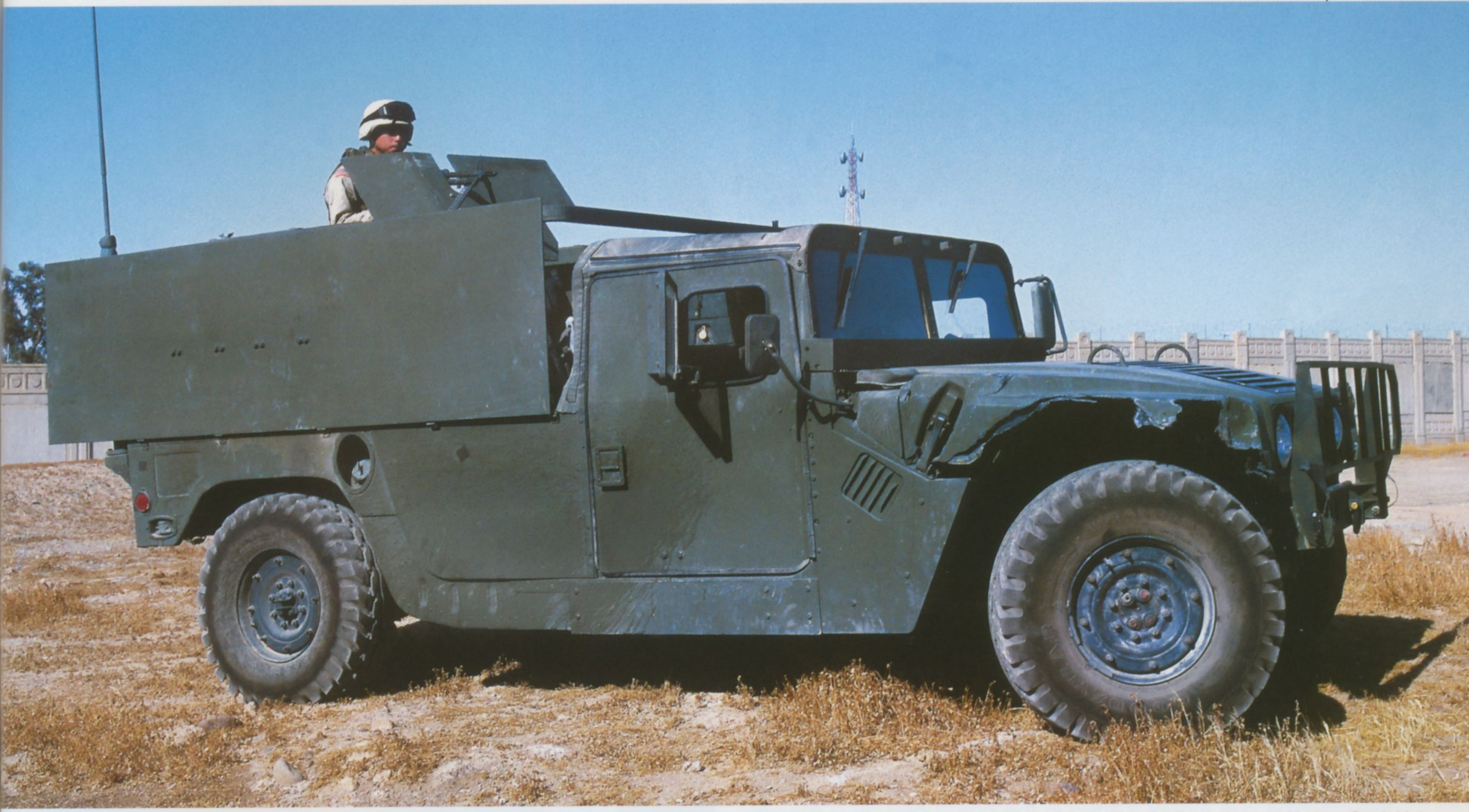
This close-up picture shows well the LRAS 3. The LRAS 3 provides its user with a real-time detection, recognition, identification and pinpoint distant target acquisition capacity. The LRAS 3 includes an HTI second generation FLIR, Daylight TV Sensor and Laser Rangefinder. Included are SADA II technology, electronic zoom (2x and 4x), standard RS-170 video, 1553 data bus, compressed digital video port, binocular display, Improved Target Acquisition System (ITAS), embedded GPS interferometer and commander's display.

Built by Raytheon Electronic Systems the LRAS 3 has been field tested by the U.S. Army since 2001. First combat action saw the LRAS 3 being used by Scout units of the 3rd (U.S.) Infantry Division at the beginning of Operation "Iraqi Freedom". In total, 42 LRAS 3 vehicles were deployed by units of the division during the advance on Baghdad. During this operational test the LRAS 3 performed well, even under extreme weather conditions such as heat and sandstorms. The only disadvantage discovered by the troops during the combat operation was that the system is only barely man-portable, and therefore dismounted use proved difficult, even though it is promoted in the system's manual. However, when the 3rd (U.S.) Infantry Division took Baghdad Airport, one LRAS 3 was manhandled up into the airport control tower. In Iraq, U.S. scout units have, up till now, used LRAS 3 to its very outer limits of operation. The LRAS 3 system is ideally suited for surveillance operations in Iraq, where often farms, roads or villages have to be observed over long distances, due to flat terrain. Several times, LRAS 3 was used in Iraq to obtain valuable information on the whereabouts of anti-coalition forces and what they were likely planning. In Iraq, LRAS3 allows border areas and other similar isolated places that anti-coalition forces favor, to be watched without the enemy knowing they were under surveillance.



The LRAS 3-equipped HMMWVs of the U.S. Army have, in addition to the surveillance system, a crew-served weapon mounted on the thirty-two inch MK64 Mod. 9 machine gun mount. In this case, an HMMWV of the 1st (U.S.) Cavalry Division is fitted with a 7.62mm machine gun in its M197 weapon cradle mount.

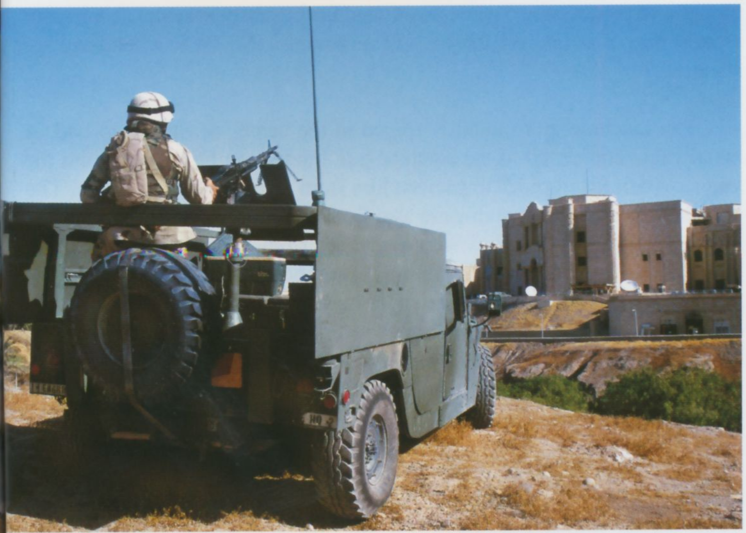
HMMWV modifications added in Germany

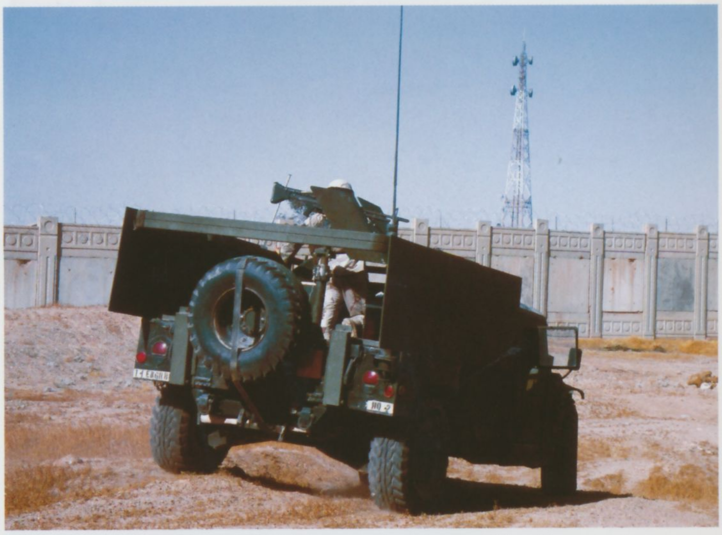


Here an M998 HMMWV cargo and troop carrier with two-door soft-top, modified by Stahlbau Metalltechnik Johann Heim GmbH in Bamberg, can be seen in Saddam Hussein's former palace in Tikrit. The vehicle belongs to Headquarters and Headquarter Detachment of the Engineer Brigade of the 1st (U.S.) Infantry Division. In addition to the modifications carried out in Germany, the vehicle was fitted in Iraq with an ASK and steel side plates for additional protection of the crew.

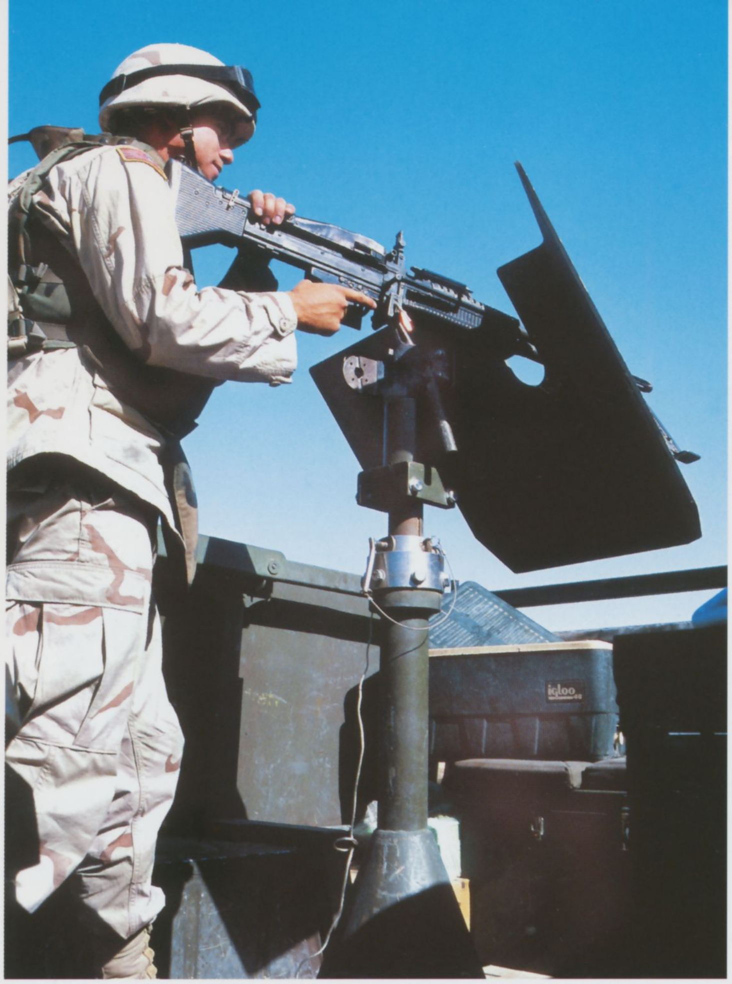
When the Engineer Brigade of the German based 1st (U.S.) Infantry Division prepared itself for Operation "Iraqi Freedom 2", it became obvious that there was a shortage of HMMWVs kitted out to perform patrol duties. The urgent request for necessary parts to be delivered through the U.S. Army supply chain caused problems. The reason was a shortage of the required parts due to the enormous needs in Iraq. Therefore the U.S. Army went to a local manufacturer in order to get the required equipment made. Within days, Stahlbau Metalltechnik Johann Heim GmbH in Bamberg fitted a HMMWV with a prototype kit, which had been manufactured based on drawings provided by the U.S. Army. The vehicle then underwent intensive testing during an exercise in the Grafenwöhr training area. The prototype performed well and only minor changes were made before series production was approved.

On the 19th December 2003, the U.S. Army ordered the modification of 24 HMMWVs, and a delivery deadline of 16th January 2004 was given. The deadline was met, and due to the good service provided by the German company, the U.S. Army subsequently ordered a second batch of 20 kits. Of this second batch, only four were fitted directly at the German company's plant, with the remaining ones being delivered in prefabricated parts to the 54th Engineer Battalion and the 1st Battalion, 63rd Armor Regiment. The kits consisted of a box for the machine gun mount, a spare

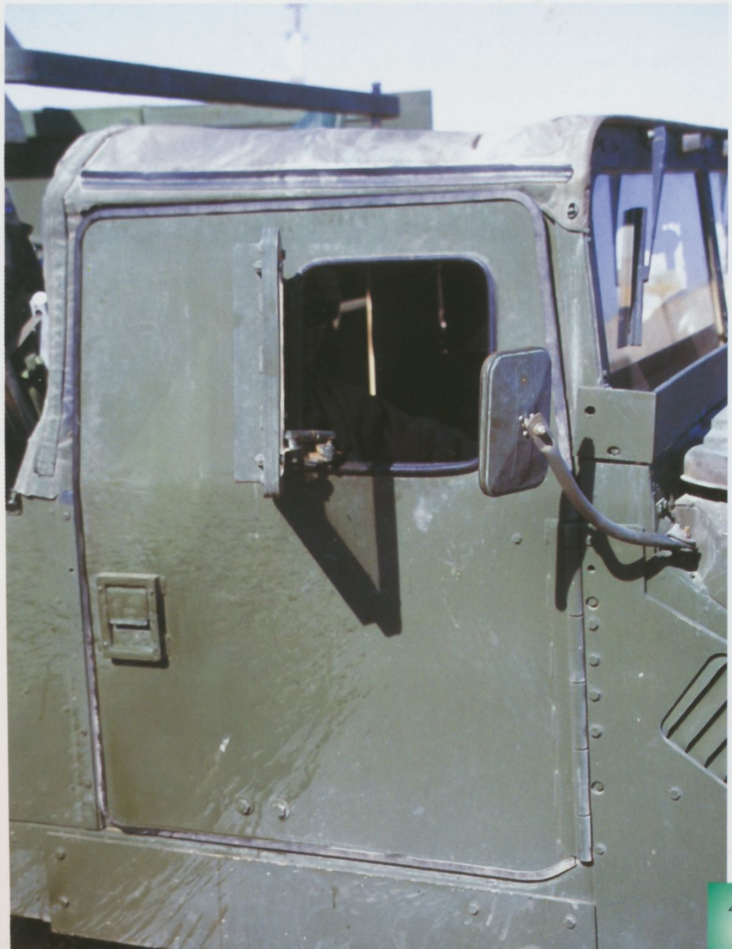


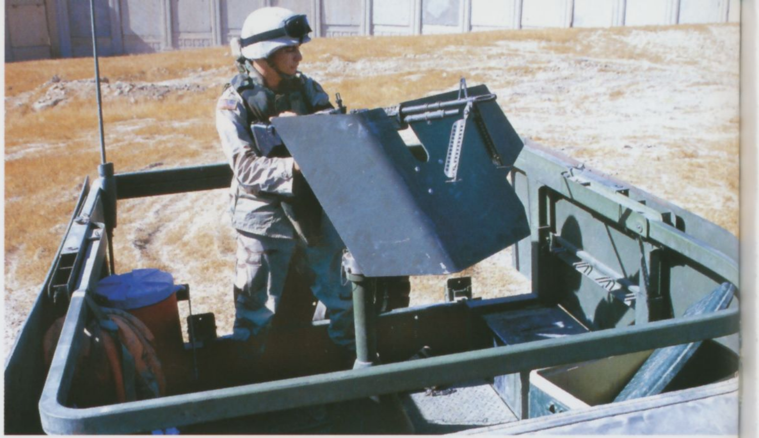


Also part of the modifications was a new spare wheel mount placed on the rear of the HMMWV. Note that two of the three roll bars are placed horizontally in order to prevent the machine gunner from falling off the vehicle.

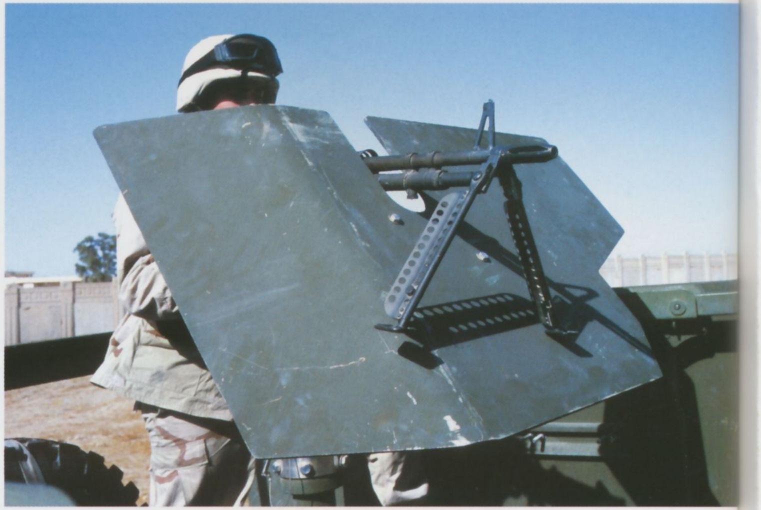


The machine gun mount is fitted in the cargo bed on a special base plate which is also a part of the modification. Note the wire which could be fastened to the machine gunner's belt equipment, thus preventing him from falling off the vehicle. This is a simple idea which would also work in the event of the gunner being shot and wounded.





This picture show clearly the frame which was constructed and fitted by Stahlbau Metalltechnik Johann Heim GmbH in Bamberg. Note the frame construction which runs around the cargo bed, and which can be adjusted in height. In addition, the front and rear parts can be raised to become roll bars. The roll bars can be mounted in different positions, and in the upright position they are used to mount a tarpaulin cover.



A close-up of the Gunner Shield Kit. The shield offers the gunner a certain degree of protection against standard small arms ammunition. The shield has a weight of 113 lbs and can be used with 5.56mm M249, 7.62mm M240B, 12.7mm M2A2 HB or 7.62mm M60 machine guns, as well as the Mk.19 Mod. 3 automatic grenade launcher. Here a 7.62mm M60 machine gun is mounted on the M197 weapon cradle mount

wheel mount, a base plate, a framework of steel constructed around the cargo bed up to hip height, and three roll bars. The roll bars could be mounted in different positions. In the upright position they can be used to mount a tarpaulin cover; when positioned horizontally they act as a barrier to stop people falling off the back of a moving HMMWV when they are standing.

The machine gun mount is placed in the center of the cargo bed. A metal cable connected to the machine gun mount can be hooked onto the gunner's belt kit in order to prevent him from falling off the vehicle. The vehicles of the second batch were also fitted with a bench on either side of the cargo bed. The benches were delivered from U.S. Army stocks, but modified by the German company. The modification of U.S. Army HMMWVs can be seen as an example of how units found their own way of getting their HMMWVs and other vehicles prepared for operations in Iraq. The German-modified HMMWVs received in Iraq also received an add-on armor package, and some where fitted with ASK and the Gunner Shield Kit.

Detail of an armored door fitted to an M998 HMMWV cargo and troop carrier with two doors and a soft-top, which has been modified in Germany. Note that the door is an early version with thin window glass, while later examples were fitted with a thicker bulletproof glass.

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